COAL AGE

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Who Gets It?

By Berton Braley

Written expressly for Coal Age

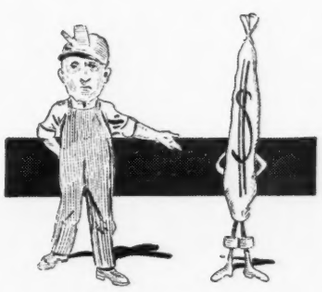
Says the Ultimate Consumer, "Hully Gee!
They are certainly a-soaking it to me!
It is truly most surprising,
How my coal bill's always rising,
There is Someone coining money, I can see!"

Says the Dealer, looking worried, "On my soul!
I'M not making ANY money on my coal,
What with freight and such expenses,
I have almost lost my senses,
And I'm really going deeper in the hole!"

Says the railroad, "All this beefing is a joke,
There's no profit hauling coal or hauling coke,
And if we don't raise our rate
For this special class of freight,
In a little while we'll certainly be broke!"

Says the Operator, "Listen—on the dead,
Though I try and try I cannot get ahead,
I don't like to be repining
But the profit's gone from mining
And it's years and years since I have made a red!"

Says the Miner, "I'M no bloomin' plutocrat,
And my wages never have been very fat,
There is Someone making dough,
Out of handling coal, I know,
But you bet it isn't me, I'll swear to that!"



So we listen to that universal cry,
As they clamor, " 'Tisn't me," or " 'Tisn't I!"
There's a profit, Someone nets it,
Yet, when people ask, "Who gets it?"
There is no one who will answer, "I'm the GUY!"

Ideas and Suggestions

Highest Efficiency--How Secured and Maintained

By E. C. Northover*

Competition in the mining industry has made a byword of the term "efficiency," and has caused the mining plant to become a school of economics. It is the desire of the operator to secure and maintain a maximum output at the lowest possible cost, consistent, of course, with safety and good operation.

For the operator to secure this high degree of efficiency, it is essential that the manager or superintendent in charge shall be a man whose integrity, ability and capacity should measure up to this standard. To maintain the highest efficiency, it is important that every official at the plant should have ample opportunity to do his best.

The superintendent should manifest special interest in the way of inviting suggestions from his subordinates, such as the mine foreman, assistant foreman and fire bosses, who are naturally closer to the problems that affect the results desired. He should establish a system that would enable him to keep a fair and intelligent record of each individual, at the same time affording himself a method of determining the strength and weakness of his company organization.

A Mine Official Is Paid for Something Other Than Physical Labor

The salary or wages paid the average mine official is, as a general thing, much higher than the wages paid the most expert workman; this is due to his superior education, training and executive ability, and it is only natural that much should be expected of him that does not come through purely physical exertion. In other words, if the mine official was paid only for such actual labor as he is expected to perform, from a physical standpoint, his rating would not be much if any above that of the ordinary laborer.

Since the results of his labor, therefore, do not come through physical exertion, but more particularly through mental effort, it is evident that the manager should adopt such a system as would enable him to determine whether or not he is getting all the fruits of the inventive minds in his employ. Unless this result is being attained, the manager is not justified in believing that he is getting the highest efficiency out of his subordinates, nor, consequently, out of his plant.

I believe it good policy for the management of a coal corporation to provide some sort of a stimulus that would in a sense set up a competition between the various officials, and thereby cause them to bring to their work the best that is in them.

This could be accomplished by providing a book at each mine; the title of the book and heading of the pages should be about as follows:

Efficiency—Suggestions and Remarks

To be used by the mine foreman, assistant foreman and fire bosses.

Suggestions or remarks shall be entered, in ink, by each official at least once each month, mentioning any new suggestion or whether his district or work supervised is up to the best practicable standard of efficiency. The column on the right shall be used exclusively by the mine foreman for remarks. All reports shall be signed by the person who makes the report.

The pages should be ruled and laid out in districts. The left side of the pages would be devoted to suggestions, while the right side, as above stated, should be used exclusively by the mine foreman for remarks. A line drawn down the middle of the page would separate the space containing the suggestions from that containing the remarks; the remarks, therefore, would appear in the space directly opposite the suggestions to which they relate.

The merits of a suggestion would be decided by the mine foreman or agreed on by joint conference with the officials at the plant. A sufficient number of pages in the back of the book should be reserved and each arranged in three columns to contain a summary of all the items for the year preceding; the third column should contain the actual results as far as research or investigation could determine.

The book would be subject to the scrutiny of the superintendent, who should also affix his signature occasionally in a proper place that could be designated at the bottom of the pages. The plan may be employed to advantage at any plant, but the idea would apply more particularly to large operations where numerous assistants and fire bosses are employed.

The superintendents at some of the larger operations do make it a practice to arrange a meeting of all officials at regular intervals for the purpose of exchanging ideas and making suggestions that might increase the efficiency at the different mines, and much good has resulted from such meetings, but never have they been as fruitful as we had hoped they would. The reason for this is because all mine officials are not orators and do not possess the ability to make an interesting talk before an audience; consequently, these men are generally handicapped in making even a simple suggestion.

Among some of the most ingenious, intelligent and successful managers we can find this class of men. It has been largely through a desire to suggest a way whereby these officials may serve still more efficiently that I have been prompted to submit this letter for publication.

*Johnstown, Penn.

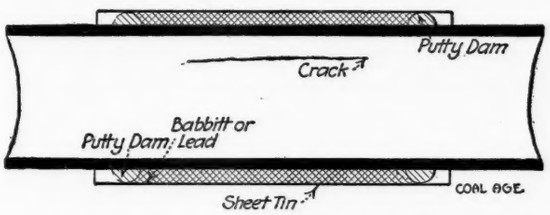
When buying retort-oven coke, it is advisable to stipulate that coking shall have been continuous for 24 hours, for often where the recovery of the byproduct is of more importance than the coke the ovens are drawn at a point of greatest economy, sometimes on as short a time as 14 or 15 hours, which produces poor coke.

Mending a Cracked or Broken Pipe

By M. G. Near

A quick and satisfactory way to mend a cracked or broken pipe, provided it is not subjected to too high a temperature or pressure, is to proceed as indicated in the accompanying sketch.

Make a couple of rings of putty around the pipe, one on each side of the crack. Wrap a piece of thin sheet tin



Cross-Section of Pipe, Mold and Babbitt Casing

around, being sure that there are no openings between the tin and putty for leakage of lead. Leave the opening on top. Pour in the lead or babbitt. After this soft metal is hardened, the mold is easily removed.

On cooling, soft metal like this usually contracts, thus drawing itself tightly around the pipe and making the repair secure.

Fire Prevention

The following excellent safety rules for fire prevention are taken from the Inland Steel Co.'s Book of Rules:

(1) Maintain order and cleanliness. Many fires are due to untidy conditions. Inspect premises daily and do not allow empty boxes, barrels, waste, etc., to accumulate, but dispose of them promptly.

(2) Ashes should never be emptied into other than metal receptacles, and should be kept away from frame buildings, etc.

(3) Oily waste, etc., oxidizes rapidly and should not be allowed to lie around, as spontaneous combustion may occur.

(4) Sawdust and other combustible material should not be used to catch oil drippings, or be placed in cuspidors. Use sand placed in metal pans.

(5) Wherever practicable, soap solution should be used as lubrication for cutting tools instead of oil.

(6) Use safety matches instead of parlor matches, as the heads of the latter often fly off when igniting.

(7) Kerosene lamps, lanterns, torches, etc., should be filled by daylight only, and never filled while burning.

(8) Do not allow incandescent lights to rest on combustible material, or anything combustible to be hung on electric lights. Paper shades should not be used. Extension lights having long wires which are hooked over rails, etc., are dangerous, as insulation is liable to wear off and cause short-circuiting.

(9) Never replace blown-out fuses with wire.

(10) Stove pipes should not be run through floors or partitions. Provide a chimney. Floors and woodwork near stoves should be protected by metal, brick or cement.

(11) Inspect chimneys at regular intervals and repair defects.

(12) So far as possible fireproof materials should be used in all construction work.

(13) Lumber piles, etc., in dry summer weather should be kept wet.

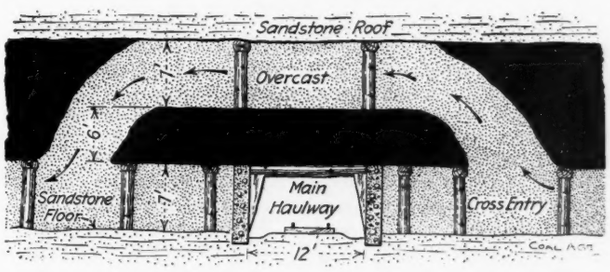
Overcasts in Thick Coal

Special Correspondence

A point of considerable interest in the working of a thick seam of coal is the advantage that may be taken of the thickness of the seam, in the matter of driving overcasts to conduct the air current across main roads.

The accompanying sketch illustrates the form of overcasts in use at the Black Hawk Coal Co.'s mine at Black Hawk, Utah. At the time the mine was opened, "Economy first" was the cry, instead of "Safety first," and this type of overcast was the result of the effort to *economize,* in every way possible, in the operation of the mine. It was the thickness of the coal seam, which in this case was 20 ft., that made this form of overcast possible. The coal is a hard, bituminous character, very cohesive, and has no pronounced face or butt cleats. This seam has a sandstone roof and floor.

In the working of the seam it has been customary to drive the entries 7 ft. high, leaving about 13 ft. of top coal, which is taken down in the rooms. It is readily seen that these conditions make it possible to drive an



General Style of Overcast in Use at a Utah Mine

overcast in the solid coal, as shown in the sketch, and that the adoption of this method of overcasting the air greatly reduced the cost as compared with the modern reinforced-concrete overcast. It was only necessary to build two concrete walls for stoppings, in the cross entries, on each side of the haulage road. The driving of the overcast represented only about 8 or 10 yd. of extra narrow work. This form of overcast presented the additional advantage of leaking less air and being more permanent.

In the working of the rooms in this mine the percentage of coal recovered in the first working is comparatively very small, as the rooms are driven up narrow, large pillars being left between them. The major portion of the coal in this seam is taken out in the second working, on the retreating system.

A good hoisting brake should be able to hold the loaded cage at any point in the shaft without the application of the pressure of steam against the engine. To give the best results hoisting brakes should act directly on the drum, for in case of accident to the engine, the brake on the drum will be able to control the loaded cage.

Substitutes for Wood Timbering in Mine Operations

By Howard I. Smith

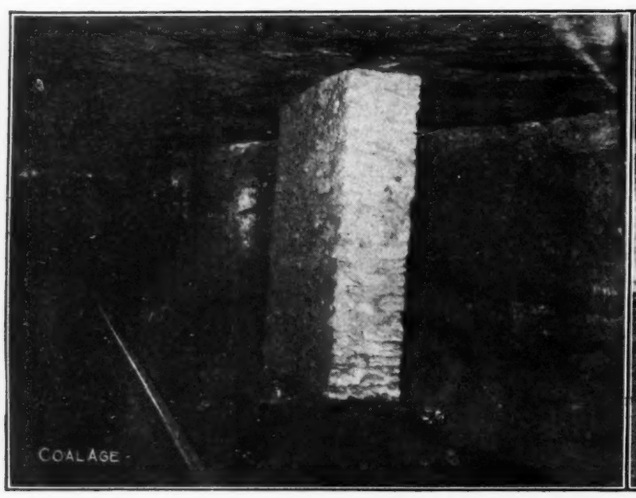
SYNOPSIS—Some notes and comments on the trend of conditions in the practice of mine timbering. The steady depletion of our forest reserves and a like increase in the requirements for mine timbers are rapidly forcing the issue to a head. Reforestation and preservation of the timber are coming into more common use, while steel and concrete substitutes are receiving a careful consideration.

In has been the practice from earliest times, in the mining of coal, ore or rock, to oppose the resulting pressure from the roof or sides of the excavated area by various types of wooden supports, such as props, timber sets, cribs, etc. Under certain conditions, pillars of coal, ore or rock are used in place of the wooden supports. This refers, of course, to excavations in ground that is not self-supporting.

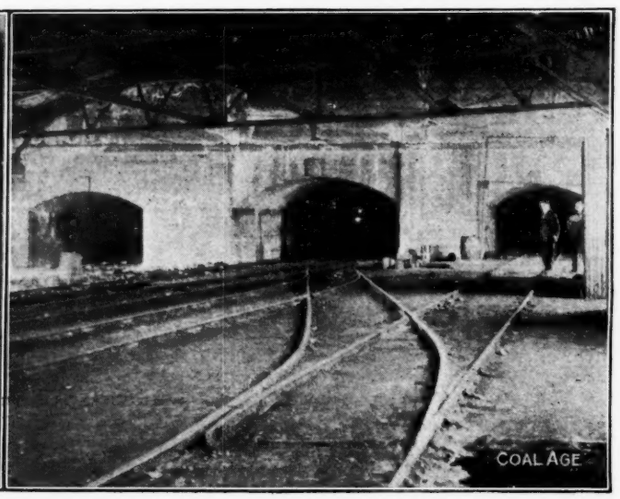
In many places throughout the United States it is still the practice to leave pillars as permanent supports. However, on account of the value of the coal or ore, it has become the practice in many districts to remove these pillars as far as possible. This, together with the increase in mining operations, has created a greater demand for artificial roof supports. The result has been that the rapidly disappearing forests are now being depleted even more rapidly than in former years.

Until recent years no successful attempt has been made in the United States to introduce mine supports other than wood, as this has been the cheapest material available. Wood can be readily cut to meet the varying mining requirements, in many cases by an ordinary laborer equipped with a saw or handax. When loaded beyond its capacity, the resulting straining or cracking serves as a warning to the miner.

No longer can the mine operators send their timbermen to the woods surrounding the mine openings for their props. The incerase in the cost of mining, due to the ever increasing cost of timber, is a problem that has necessitated a great deal of study. The need of more systematic timbering has been discussed in many papers on accidents due to fall of roof and coal, on maximum recovery of coal, etc. While no direct remedy has been suggested, that could be adapted to all conditions, there can be no doubt but that much further relief will be afforded by continued work and study along the following lines: Reforestation, reducing loss by decay, timber economy in mines, adopting methods of mining which reduce the timber consumption for maximum recovery of coal, substituting other materials for wood.



Masonry Wall Laid in Mortar



Typical Application of Concrete to Mine Portals

Reforestation

To indicate what is being done to meet the ever increasing demand upon the forests of Pennsylvania, I have taken some figures from the address of Henry Drinker, president of the American Forestry Association, published in the *American Forester* for March, 1912.

Pennsylvania has a Department of Forestry, with a commissioner and a deputy commissioner; also a State Forestry Reservation Commission. It has the second largest state forest reserve in the United States (about 1,000,000 acres), with provision for the purchase of land not exceeding $5 per acre. There is a fine protective system. The state has taken the lead in the campaign against the spread of the chestnut blight by its generous appropriation of $275,000 for the work, and the effective measures taken thereunder. There is also under consideration the enactment of legislation taxing timber land at a small rate per acre, and there is one college and an academy in the state giving courses in forestry.

H. S. Graves, the United States Forester, gives full information of the splendid work being done by the U. S. Forest Service in his report for 1912. The report shows that on June 30 the national forest reserves covered a

Note—Paper read before Coal Mining Institute of America, Monongahela, Penn., June 16, 1914.

total of 187,406,376 acres. These contain a total of 600,000,000,000 ft. of merchantable timber.

It may be interesting to note that among the private interests engaged in the practice of forestry in 1911, the U. S. Department of Forestry reports ten coal companies with acreage distributed as follows: Ohio, 34,510 acres; Indiana, 100 acres; New York, 10,000 acres, and Pennsylvania, 43,308 acres, a total of 87,918 acres. Another company having both coal and railroad interests has 100,000 acres in addition to the above; this has no doubt been increased in the last three years.

Reducing Loss by Decay

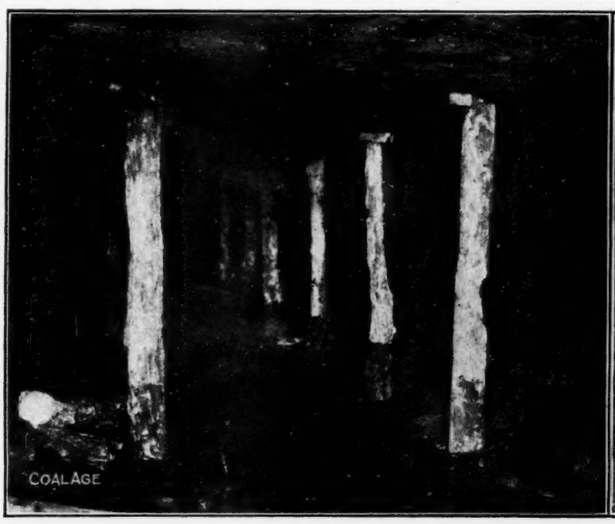
The reports of the U. S. Department of Agriculture set forth that 45 per cent. of timber taken into the mines, decays. This statement has been given wide publicity in various periodicals. To reduce this large percentage of loss, several methods have been adopted. The simplest expedients are to peal the timber before use, and to use judgment as to when it should be cut. Timber cut during the summer months decays much more rapidly than that cut during the winter. Loblolly pines cut during the summer have been observed to show the first evidence of decay within six to eight weeks.[1] Timber after reaching the mine has been given the brush treatment with whitewash, cheap paint, creosote or carbolineum with effective and economical results. Timber has also been treated with creosote and zinc chloride at an additional cost of 20 and 12 per cent., respectively, with the result that its life has already been increased 300 per cent., and it is still in good condition.[2]

Several large coal-mining companies have found it necessary to install plants for the treatment of timber for use in mines. Treated timber would come into more general use if it could be more readily bought in the open market. The preserved timber on first thought, could be used to advantage only where permanent timbers are desired, but this is not necessarily true. Timber which is to be kept in the mine for one year would be of more value if treated, for this may be taken as the life of mine-timber in any except the best of atmospheric conditions. This time limit may seem rather low, but one would seldom reuse a timber after it had been under ground for a year; it may still look strong, but it has lost a great deal of its vitality.

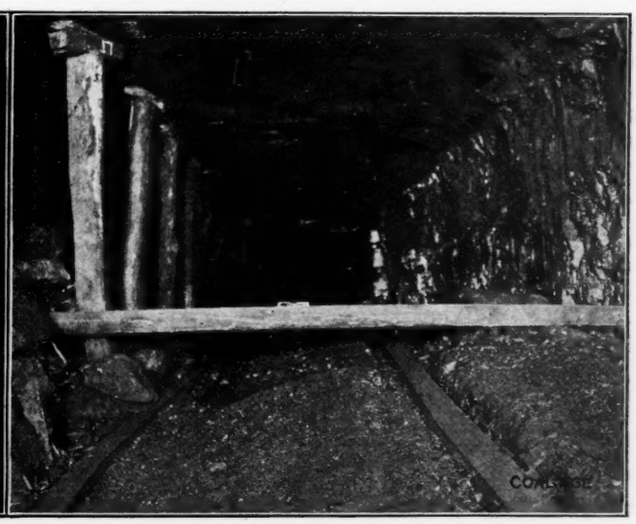
One of the accompanying figures shows timber that has stood for 25 years. These timbers, at first glance, appeared to be in an excellent state of preservation (not a single prop had fallen out), although upon careful examination it was found that a penknife could easily be buried to the hilt in any of them. These props had been split from the center of white oak trees and contained little or no sap wood. Manifestly, there was no weight on these timbers, the roof being supported by the adjacent pillars.

The use of mine timber preserved with creosote or other oils has frequently been condemned on the ground that they increase the inflammability of the wood. Again, in case of fire, the irritating effect of the smoke produced is great. Some European experimenters claim that only a few drops of such preservatives, when burned in a room, make respiration impossible. I am advised by the superintendent of a preservation plant of one of the railroads that after treated timber has stood for two or three months it becomes very difficult to ignite it.

The necessity for protecting timber from the weather, the proper time to season and other interesting features are well illustrated and described in a paper by E. E. Ruter, Coal Age, Feb. 21, 1914, page 331.



Apparently Good Timber Rotted through



An Excellent Condition Where Pointed Posts Could Be Used

Timber Economy in Mines

Timber economy may be attempted in two ways: By the use of a portable sawmill to utilize broken or otherwise worthless timber, and by dressing the timber to most economical proportions and shapes.

Portable sawmills have been installed by a number of mining companies for the purpose of sawing up broken timbers and odd lengths into sprags, caps, lagging, and even into lumber. One company using a portable sawmill reports a large saving, which would make it appear that the amount of broken timber and odd lengths being

[1] Penna. Mine Inspector's Report—1912. Part I. Page 20.
[2] Penna. Mine Inspector's Report—1912. Part I. Page 20.

covered up daily in the many mines of our country is an appreciable item.

Decrease in the first cost of timber may be accomplished by reducing the freight bills. This may be done: (a) By removing the bark as soon as the timber is cut and allowing the water to dry out. At the same time this gives the timber a better opportunity to season, which adds strength and retards decay; (b) by slabbing the timbers where cut, thus eliminating the transportation of a large tonnage. The Department of Agriculture reports that slabbing a prop tends to increase its unit strength, probably the effect of improving its straightness. Conclusive results could be obtained only by comparing materials cut in the same area. The unit strength of a round post is much stronger than the same post split; likewise, the unit strength of round timbers used for beams is much less than when the beam is sawed in the correct proportions of height to breadth to give the best unit strength design.

Under favorable conditions of roof and floor, props may be made more serviceable, and at a considerable saving, by sharpening one end in the form of a wedge, or to a point, so that the prop will yield somewhat before the elastic limit has been reached. The results of some tests published by Emil Stens in *Gluckauf*, Apr. 29, 1911, are given in the following table. The props consisted of straight pine 10 c.m. (3.94 in.) in diameter and 1.4 m. (55.12 in.) long. Five props were used for each test:

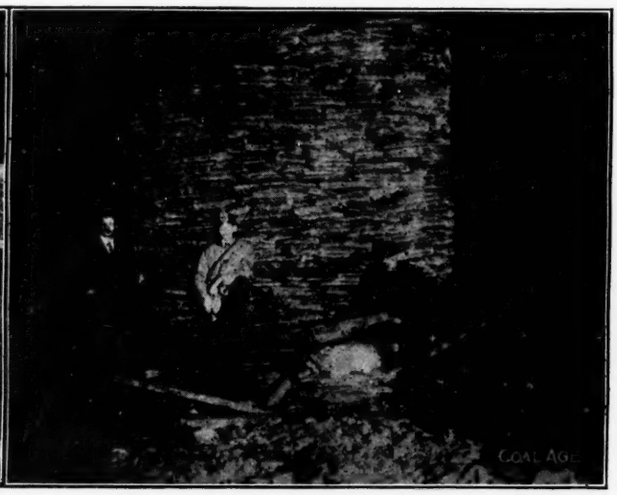
	Pressure (Tons)	Compression (%)
1. Props fastened at upper and lower end...	15.1	0.31
2. Prop with a 4-in. wedge shaped cap on top	16.3	5.2
3. Props with 4-in. wedge on both ends.....	14.1	8.7
4. Prop with a 4-in. wedge shaped cap on top and beveled at bottom; length of bevel 1.5 times the diameter.....	16.8	17.5
5. Same with bevel three times the diameter	15.3	18.2

The results of these tests show the yielding capacity of props can be increased from 0.3 per cent. to 18.2 per cent. without decreasing the carrying capacity of the timber. On account of the varying grain in the wood, it is always best to toe the bottom of the prop into the ground one or two inches. The best results are obtained by using a cap piece with some sap wood; this, being soft, allows the prop to adjust itself to more even pressures.

W. H. Hepplewhite, who was among the first to try out the pointed or tapered prop, conducted a test on props 6 ft. long and 6 in. in diameter with a 15-in. taper. At 15 tons, the prop began to blur out at the bottom, and at a pressure of 34 tons the prop began to buckle in the middle. This allowed a roof depression of 15 in. without damage to the bulk of the prop, whereas a prop with square ends would have broken and become useless when the roof had come down about 2 in. The former prop could have been redrawn and reset; the latter could not. Men using axes to cut their props instead of saws can taper a prop with a loss of but little time.

The use of pointed props for gob timbers is well worth serious consideration where the pillars are under considerable pressure and the floor is medium hard. A floor of this kind is shown in the accompanying figure, the cross-bar in this picture being level. This same effect is produced in a minor way by placing the wooden prop on a pile of soft dirt, but this does not seem so practicable since the compression at first is very rapid at low pressure and then quickly changes to a very slow rate of compression. Ideal places for the use of pointed or yielding props are shown in two of the accompanying figures.

TYPICAL HAND STOWING USED AS A ROOF SUPPORT



DRY WALL BUILT UP IN THE FORM OF A PIER

ADOPTING METHODS OF MINING WHICH REDUCE THE TIMBER CONSUMPTION FOR MAXIMUM RECOVERY OF COAL

The timbering problem is so closely related to mining methods that this phase must be considered sooner or later. The methods which undoubtedly give the least trouble from falls of roof are the strippings of Kansas or eastern Pennsylvania, about which we recently have had an opportunity to read so much. Beginning with this method, timber consumption increases until we consider the caving methods, which are undoubtedly among the greatest consumers of timber. Among other methods we can compare the room-and-pillar system, where so often no attempt is made to recover timber, and with the longwall method, where a large part of the timber is recovered.

In a class by itself is the system of hydraulic filling. Here the first excavations are filled or partly filled with loose material, which in time acts as a pillar to support

the roof while the coal is being removed; this will support the roof and stop squeezes where all other known methods have failed. I have observed pillars being extracted with the use of very little timber where a squeeze had heaved the bottom of an old entry tight up against the roof, which was almost entirely supporting it while the coal was being removed.

Substitutes for Wood

After the adoption of such of the preceding methods as may be practical, the mining industry may still be in need of more permanent, substantial or more economical mine props, especially as our mines become deeper and extend over more area, and where a large percentage of the coal is to be extracted. With this in view, we may consider what has already been done in securing substitutes for wood.

First, hydraulic filling; this has been of the greatest economic value from the standpoint of recovery of coal and saving of wood. No attempt will be made here to discuss the many phases of this important subject. The accompany figure shows the culm standing in a straight wall, requiring no lateral support, while the coal is being extracted.

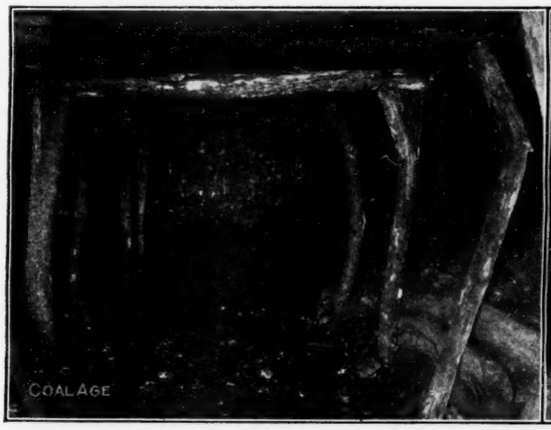
Second, hand stowing of waste materials from the mine either along the main passages or in the working place or as pack walls in longwall work. A pack wall in an Illinois mine is shown in an accompanying figure.

Third, the building of piers or columns with mine rock without the use of cementing material, as shown in an accompanying illustration. Piers of this type when compressed about 30 per cent. will carry a load about equal to what coal will stand in the pillar. A pier of this type is very serviceable and costs about $1.25 per cu.yd. for construction.

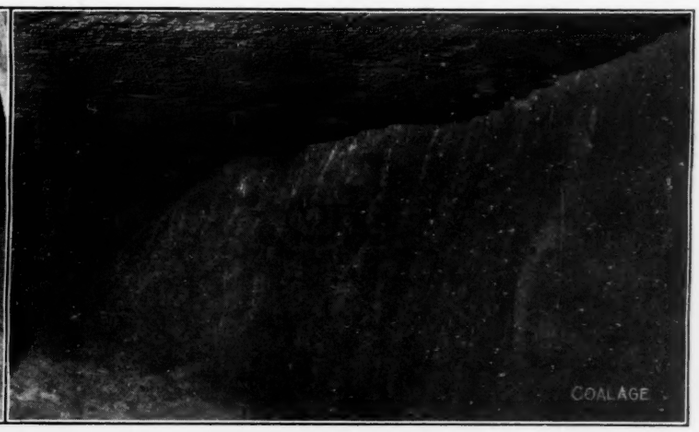
Fourth, the use of well constructed concrete, brick or stone piers or walls, either alone or in conjunction with steel or wood beams. A stone pier used at the junction of a butt entry aircourse and the face entry is shown herewith. Supports of this construction must be considered as perfectly rigid and are used to prevent the roof from bending and subsequently falling. After weight has been supplied to a support of this type greater than its compression strength it is of no more value. It is unlike a support of similar material which has been built without mortar, the latter having a greater supporting value with the increase in the compression.

The use of concrete or masonry arches and walls with steel beams are gradually eliminating the old-time prop with brush lagging, and the later use of large and more permanent timbering for mine portals, shaft bottoms, underground stables, pump houses and other similar places where it is very important that there will be no delays due to a fall of roof. In one mine recently visited approximately one mile of concrete and brick-lined entry had been installed. One of the accompanying figures shows the use of concrete for mine portals, steel ties imbedded in a concrete floor and a steel tipple.

A concrete or masonry wall built along the haulageway to support the cross beams not only acts as lagging, but should a trip of cars become badly wrecked there is no danger of the end supports of the cross-bars becoming dislodged and allowing the roof to fall. Where concrete or brick piers for end supports of beams are to be built, advantage should be taken of this practice and the wall built up solid to the top of the car. The pier for the beams may then be built on top of the wall.



Where Pointed Props Might Have Been Used to Advantage



Example of Culm Filling in the Anthracite Regions

Fifth, steel sets are frequently used in place of wood on important haulage or airways as a permanent mine roof support. Discussions on this phase of timbering have been so thoroughly covered in papers read before this institute by R. B. Woodworth, of the Carnegie Steel Co., and in later papers by him, in which he keeps this important topic uptodate and constantly before the attention of mining men, that it would be folly for me to attempt a lengthy discussion of this subject without the use of quotation marks.

Among the more important installations of steel timber sets, the Carnegie Steel Co. gives the names of 50 companies that are using steel in gangways and entries, pump houses, underground stables, etc. A complete list would probably include nearly all the large companies of the United States.

The first cost of steel timber, erected, is usually two to three times that of wood, but this is usually warranted by the increased life and the large expense sometimes necessary to clean up a fall. Another very important consideration is the reduced output caused by blocking a haulageway. One of the accompanying figures illustrates what often happens in case of a cave. This pic-

ture was taken after a test in the experimental mine of the Bureau of Mines at Bruceton, Penn. A very interesting comparison, showing the advantages of steel I-beams over steel rails, white oak, chestnut and white pine, is given in an article by A. W. Hess, COAL AGE, Feb. 28, 1914. One of the points brought out is that a 4-in. I-beam will do the work of an 8-in. round timber.

Sixth, the use of steel or iron props at the face. This practice is possible only where all the props can be recovered, or in that portion of the mine where it is possible to recover the props before they have become overstrained to such an extent that they must be straightened, repaired or sold for scrap.

Props are made to serve either one of two general purposes. The first type is the rigid prop, which fails upon a compression of a very small per cent. Such props are used to keep the roof in place and prevent it from starting, for instance, in the case of a tender shale above a flexible roof coal, the use of the rigid prop being to hold the roof coal up against the shale. The second type of prop is used to support the immediate roof where its movement is practically irresistible. This type of steel prop can be made yielding only in combination with wood or by allowing a part of the prop to rest in a cavity filled with peat or other loose materials. The yielding steel prop is probably used in Germany more than any other country.

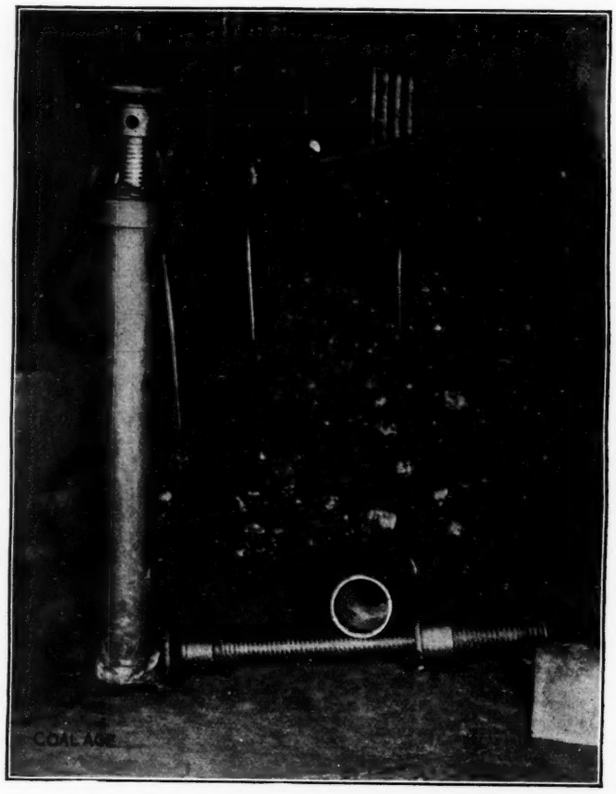
In either case, the type of steel prop giving the best results from a structural standpoint is the pipe. This has been tried in the anthracite region where great supporting power was necessary. The pipe was cut to length and a flange placed on both ends to increase the bearing surface. Scrap pipes from old culm lines have been used in stables and such places after filling the pipe with concrete.

The most economical design of steel to withstand compression is the "H" section beam, where the radius of gyration is nearly equal about both axes. This design has been used in England since about 1890 and is now quite common. It has also found a market in the anthracite district to a limited extent. The chief drawback in both the pipe and "H" section is the inability to readily change the length to suit conditions. This has been overcome in several different ways.

A most ingenious design of a roof support is in the form of a pipe with a screw jack head; this was used in a bituminous mine of Pennsylvania about 1906 (see accompanying figure). These props were made to protect a coal conveyor in longwall work, but they would also be of advantage in many mines as temporary props under draw-slate, or for protection in taking down bad roof.

Another form of adjustable prop, manufactured by Herman Schwarz, of Essen, Germany, consists of a channel bar with a T-beam telescoping into the channel; the lower end of the beam is slightly wedge-shaped. The beam contains horizontal slots and it is raised to the proper height, then forced against the roof by iron wedges driven into slots and resting on the band on top of the channel bar. A wood wedge is then driven in between a movable ring and the wedge-shaped end of the T-beam. The iron wedges through the beam are then removed and used at the next post. An oval-shaped bolt is provided for use on the back side of the channel. When it is desired to remove the prop this bolt is given a one-quarter turn, which brings it to the flat side of the bolt and loosens the wood wedge on the front of the channel and allows the prop to collapse. The compression of the wedge allows the props to yield at a load of 15 tons, which is regulated somewhat by the kind of wood used for the wedge. This prop has found use in both Germany and Belgium.

The Mannesmann Mildless Steel prop consists of two pipes, one telescoping into the other so that they can be adjusted to the proper height. They are held in position by a clamp which is attached on the outside of the prop in such a manner that it cannot slide down. It is claimed that the clamp can be screwed to a resisting force of 15 tons, after which time the telescoping will proceed as that weight is being applied. Good results have been obtained by using these at gate ends and to the first waste conjointly with tapered props. These props, as the ones above, can be easily removed from a distance.



"JACK" USED AS A TEMPORARY SUPPORT

CONCLUSIONS

One of the most important means of obtaining economy in the use of props is to provide a method of mining whereby a maximum amount of timber may be recovered. While this change is being made, attention should be directed to more economical utilization of the timber now available and to increase the wood supply. The latter must be done by reforestation; the former by preventing loss due to decay, cutting beams so as to have the greatest unit-bearing value and pointing the props so they will yield to compression slightly under the breaking load.

Concrete, stone and brick piers and walls have proved

desirable, especially where steel beams are to be supported, but they are not recommended for permanent supports to withstand great pressure. These three materials are also used to great advantage for mine portals, shaft bottoms, underground offices, stables and pump houses. Dry pack walls or piers and hydraulic filling are the successful supports to irresistible pressures. The use of steel sets has been firmly established in the United States, and they are giving satisfaction both with regard to cost and efficiency. The use of cast-iron props has given way to later designs in steel. Steel props are gradually becoming more extensively used abroad, and before long we can look for their general adoption in the mines here.

Results of 48 Tests

The investigation of mine roof supports has been started by the Bureau of Mines for the purpose of determining what are the best materials to use for supporting the roof and how these different materials and appliances act under load. Forty-eight tests were made in coöperation with the Pennsylvania State Anthracite Mine Cave Commission during January, 1913. These tests and others made later, supplementing that work, are as follows:

Heavy Fall Blocking the Haulageway

Four tests were made to determine the bearing value of props placed in a vertical position.

Four tests were made on dry rubble masonry to determine the unit-bearing value at different percentages of compression.

Five tests were made to determine the unit bearing value at various percentages of compression on loading yellow pine, oak and spruce cogs unfilled and filled with loose mine rock.

Two tests were made to determine the unit bearing value at different percentages of compression for square mine rock cogs laid up in cement mortar, the interior hydraulically filled with culm, sand and ashes.

Seven tests were made to determine the unit bearing value at various percentages of compression of sand and anthracite ashes equal parts, broken mine rock and breaker refuse passing through 1½-in. screen. Placed in steel cylinders.

Twenty-one tests on concrete of various mixtures of sand, sand and gravel, anthracite ashes, sand and breaker refuse, sand and broken mine rock and culm to determine the unit bearing value. The first set of seven was tested at the age of seven days, second set at 34 days and the third set at 96 days.

Five tests consisting of loading reinforced concrete columns and brick piers to determine the unit bearing value at maximum load. These tests were constructed and tested by the U. S. Bureau of Standards and the results given to the Anthracite Mine Cave Commission.

One test was made on a support designed by George S. Rice. It consisted of a concrete cylinder filled with mine rock and sand. The object was to determine the advisability of using such a design around gas or oil wells. This type may be used to great advantage for a pack wall along haulageways in longwall work, in arresting a squeeze or in supporting valuable improved property on the surface.

Three tests were made on concrete blocks to determine the advisability of their use under valuable surface improvements.

Twenty-one tests were made on loosely packed materials from the anthracite region to obtain a comparison between the different materials when subjected to loads.

Eighty-four tests were made to determine the compressibility of different materials from the anthracite region that are available for dry and hydraulic filling.

Fifteen tests were made to determine the effect of settlement of the above materials due to shaking, spading and tamping.

Seventeen tests were made on bituminous coals from the experimental mine.

All of these tests were made to determine what different uses materials around the mines may be economically put to for the purpose of supporting the roof while getting out all the coal and at the same time causing as little damage to surface property as possible. Some of these tests were made on wood for the purpose of getting a comparison between the materials used and some material with which we are already familiar.

In Bulletin No. 25 of the U. S. Bureau of Mines are the results of 15 tests conducted under the direction of Messrs. Griffith and Conner, and in the appendix are the results of 416 tests on anthracite coal made for the Scranton Engineers' Club, in 1900.

With the exception of the latter, which is very complete, these tests must be considered only as a preliminary investigation, and each branch must be continued to duplicate the tests conducted before the results can be accepted as authentic.

In furthering these tests a large amount of work has been outlined, including tests on concrete and steel props, not so much to determine their strength as to determine their behavior and what is the best type that can be adapted to mining practices.

The best method of splicing differently layed ropes is to open the six strands of the long-layed rope to the full length of the intended splice, then open the six strands of the shorter-layed rope for about a yard, join the ropes to form a long and short strand. Then lay the long-layed strands into the place of the short-layed ones, then run the ends in, being sure to lap the strands that run inside for their full length, with a piece of string, so that the strands will be the same size as that taken from the middle of the rope. This method prevents the twisting out of splices and allows the splicing of any two different sizes of ropes together by means of laying the big rope into the smaller one.

Sanitation and Simple Ways of Making It Effective

By Dr. R. D. Roller, Jr.*

SYNOPSIS—The first step toward sanitation is fences. Water, sewage, garbage disposal, disinfection and the proper diligence in stable cleaning are all necessary to secure the health and efficiency of the individual workers.

Medicine is drawing nearer each day to its ideal—the prevention of disease—and sanitation is one of the great cornerstones on which prophylaxis is built. As prevention of disease is of more importance than the cure, so it is of more importance to keep a man's working ability at par, than to try to build it up after it has declined.

Sanitation and efficiency go hand in hand. The man who has a child at home, in bed with typhoid fever contracted from flies or bad water, cannot be 100 per cent. efficient at his work. The man who has to sleep with the odors of a pigpen in his room, with flies from the garbage pile swarming about him, with mosquitoes from a stagnant pool of water singing around his head, is not 100 per cent. efficient. These are a few of the things that sanitation takes note of, and, while striving to prevent disease, at the same time seeks to increase human productiveness.

The incorporated town superintends its own sanitation, however well or badly this may be done, but the mining town is under direct control of the mining company, and must depend upon that company for its sanitation, So, aside from the fact that sanitation makes for efficiency, and, therefore, that it "pays," it is also a moral obligation which should be assumed voluntarily and cheerfully.

I think the start in sanitation should be made with a hobby, a hobby that is so practical that it seems to be indisputable. This hobby is called "fences." Each house should be fenced.

This should be done when the house is built, so that the cost will not seem burdensome. Each yard must be cleaned of rubbish before occupancy and what is of more importance, each tenant must be told that that yard must positively be kept in that condition.

A sidewalk should be laid in front of the houses and the roads be kept passable. In summer no water should be allowed to stand in the roads and all holes should be carefully filled. These are places for the breeding of flies and mosquitoes, and, though malaria is not prevalent in West Virginia, still the mosquito is an annoying and useless insect.

Pigs Should Be Isolated

Pigs should not be allowed to roam at large, and none should be kept near any dwelling; certain parts of the property, at a distance from the houses, varying with the circumstances, can be allotted to those who wish to keep them.

Enclosures for chickens should be fenced, but these, of course, can be at the rear of the houses.

The closet is the greatest difficulty with which we have to contend. There are many ways of arranging these, from buckets which are to be removed every week, to pits which are deep enough to be practically permanent. The bucket is good, but the constant cost of removal eventually becomes a source of irritation and often neglect follows, resulting in the very condition which it is sought to avoid.

The best, cheapest and most satisfactory method is the old-fashioned pit. This should be dug 5 to 6 ft. deep. The sides should be lined with 1-in. plank to prevent caving. These should project a few inches above the surface with a strip of board nailed across their ends, practically forming a foundation.

The house should be small and light. A mistake is often made in making it so large and cumbersome that it is hard to handle. It should be built independently of the foundation, but should be fastended to it securely, and in such a manner that all light is excluded. No windows should be put in the house, but if thought necessary for ventilation, small holes can be cut near the eaves and covered with wire screening.

The door should have a spring and be thus kept closed at all times. In this way the pit is kept in darkness and is no longer a breeding place for flies. Nor can flies lodge here and board in the kitchen, a condition which too frequently exists.

The pits should be treated with crude carbolic acid, at least once every two weeks, and a supply of lime should be kept in the house for the convenience of the user. Once a year the house can be removed and the pit cleaned, or when it becomes too full it can be covered with earth and a new one made nearby.

A unique scheme has been used by one coal company, which is as effective as it is cleanly. A 10- or 12-in. pipe was laid under 20 or more houses, with an opening under each house. A nearby stream was diverted into the pipe, flushing it continually, thus answering all the purposes of a sewer without its expense.

I would like to have a plan I have had in mind for some years tried. The same general arrangement of pipes may be used, but should be connected to a common sewer. These pipes should be flushed automatically once a day from a tank built for that purpose. The sewer can be discharged into a river or large stream, or, lacking that, several large cesspools could be dug, or a septic tank might be used. I believe that this is an ideal system where the water supply is abundant.

Careful Garbage Disposal Is Important

The question of garbage disposal is a second serious matter. A box, made of wood, or, preferably, galvanized iron with a tight lid, should be placed for each house. It is better to use these boxes if possible for ashes, tin cans and other dry rubbish and have the tenants put their slop in covered buckets. This slop can be collected in a separate compartment or in a large covered box that can be carried in the garbage wagon.

By a special arrangement with the driver, the owners of pigs can have the slop hauled to their pens and thus

*Eccles, W. Va.

Note—Abstract from a paper read before the West Virginia Coal Mining Institute, at Cumberland Md., June 3, 1914.

make use of it to a considerable extent. A place should be selected in a secluded spot for the disposal of the rubbish and all slop not fed to pigs should be buried or burned.

A garbage box without a bottom has been used with success in some places. I believe it has the advantage of not getting dirty and foul smelling so quickly, and there is less danger of scattering the garbage when collected. The box can be easily turned on its side, the garbage shoveled up, and lime sprinkled on the ground before replacing the container. If, for any reason, water gets into the box, it drains out readily and does not make such a bad mess of débris to handle.

Every precaution must be taken by the driver to prevent the scattering of rubbish on the ground.

A rigid rule must be enforced requiring cleanliness and prohibiting the throwing of trash about yards, and upon any violation the latter should be cleaned and the cost charged to the tenants. This acts as a punitive measure, but is at the same time just and fair to all.

It will be of great advantage and soon pay the difference in cost to get a good man, who is thoroughly reliable and has some tact, to drive the wagon. The difference that 25c. a day makes will be recognizable in the amount and quality of the work done. Rounds must be made as often as necessary; once a week, at least.

The water supply must be given full consideration. A system of pure water should be furnished and hydrants placed at convenient points, if not at every house. After a central system is installed and water obtained from one large source there is not great danger of contamination, but if wells are used, an examination should be made frequently to see that no contamination has taken place.

Around each hydrant a base of concrete should be built to prevent washing of the earth and standing water. It would be best if a drain be put in and the water carried at least away from the roads and yards.

Before deciding upon the water that is to be used, a thorough bacteriological examination of any springs that are in use should be made for contamination, and any not absolutely pure should be sealed up.

The camp officer should be made the special sanitary officer provided the company is not large enough to afford the employment of a man for that special purpose. He should make a thorough inspection of the town at least once a month and report any conditions that need correction, calling special attention to flagrant violations of any rule.

Most People Like to Be Clean

The great majority of people like clean homes and surroundings, even though they do not realize it. They should be encouraged in keeping their premises in good condition. They should be assisted in making gardens. Front yards should have grass and flowers and back yards should produce vegetables.

In the same enclosure, one cannot have chickens and flowers, nor pigs and vegetables, and no garden can exist in a yard littered with garbage, ashes and old tin cans.

The children must be brought into any scheme of improvement and their cöoperation secured. The best place to teach them is in the school, and the teachers should be asked to give their aid by talking to the children a short time each week on general sanitation, and what it means.

Insistence must be made upon the fact that clean surroundings with a dirty house are unthinkable and every effort must be made to have clean homes within as well as without.

One great asset toward cleanliness is a central bath house. At each mine a bath house should be built with a system of lockers, each made of steel and well ventilated. There should be one locker for each man and a small rental can be charged for its use.

Adjoining this locker room, but not in it, showers should be built with concrete floors. These, of course, must be supplied with hot and cold water. Perfect ventilation must be provided, and when heated in the winter, care must be taken that the air in the locker room does not become too humid.

There are times when disinfection of a house becomes necessary even when there are no so called contagious diseases. A friend of mine told me of a mining camp, of which he had recently taken charge, in which there was such a prevalence of tuberculosis as to almost approach an epidemic. This called for disinfection of all houses, in which there were active tubercular patients or in which any had died recently, as thorough as after a release of a scarlet-fever patient. This is a point frequently overlooked.

The Care and Disinfection of Stables

In view of the fact that it is thought highly probable that infantile paralysis is transmitted by the fly, care should be taken to destroy all breeding places of this insect around the stable. Manure should be kept in a dark place and covered if possible. Kerosene poured on it will destroy the larvæ. The stable itself should be kept clean and occasionally disinfected by burning sulphur, after it has been tightly closed.

I would also like to suggest that that part of the store where meat is sold should be screened. One of the best ways to do this is to screen the counters, leaving small openings, with self-closing doors, through which the packages may be passed.

There has been a great deal discovered in the last few years in regard to hookworm, and its connection with so called laziness. I have found two or three cases in my practice. This disease exists practically everywhere south of the Potomac River, and though found more frequently among the country people, I believe it will develop to some extent among miners and others.

Hookworm ova develop in temperatures ranging from 77° to 95° F., but they have been known to mature in mines at a uniform temperature of 68° F. Lower than this there is probably no development of the ovum.

Infection occurs most frequently through the skin. For this reason country children are most liable to infection, as fecal matter is here more frequently scattered over the ground, the children getting the larvæ on their feet.

Hookworm causes symptoms varying from lassitude to complete debility. Where many men are infected there is a great decrease in the amount of work done by a given number and many more must be employed. I wish it were possible to give definite statistics; these, however, will be secured in the near future. And in the meantime, it will be well for the operator to bear in mind, and carefully consider, that the day may come when fighting the hookworm will be a part of mining sanitation.

Modern Collieries of Durham, England

By Samuel Dean*

SYNOPSIS—Brief description of a new field recently developed on the southeast coast of Durham. Four collieries are being developed, the oldest mine—that at Horden—having entailed a total expenditure of nearly three million dollars in its initial construction.

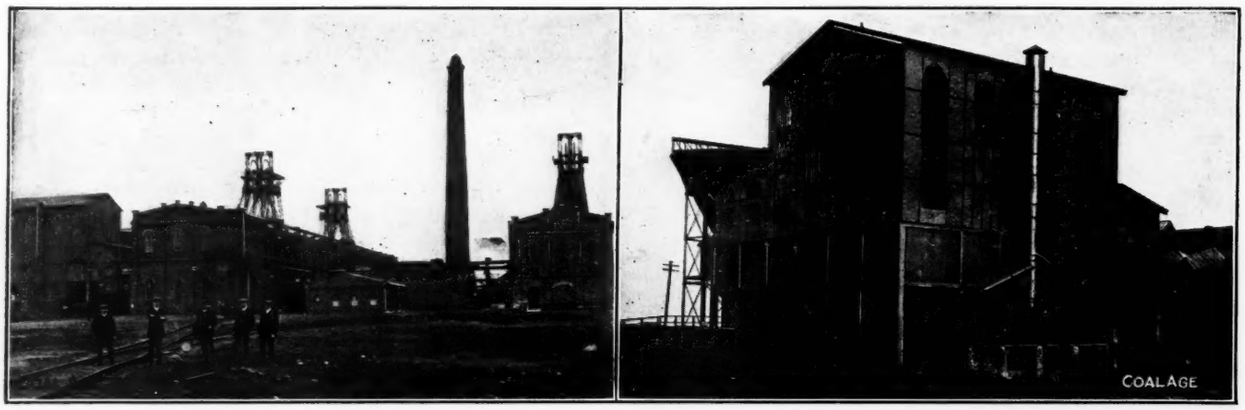
What has been called the wonderland of Durham is the southeastern part of the country, between Leaham Harbor and the Hartlepools served by the coast branch of the North Eastern Ry.

Twelve to fifteen years ago this part of the country through which the coast line runs was inhabited only by a few scattered agriculturists, and was the home of the fox and the hare. Occasional fox hunts took place, and the pitman was only seen there when he came over from the collieries farther east to attend the greyhound coursings, and as is his wont, he spent the evenings in song and merriment at the country taverns.

It may seem strange that in England, a rich portion of a coalfield should be without a railroad for so many years, but along the southeast coast of Durham the cliffs are high and numerous deep gorges intersect the land. It had long been realized that the construction of a railroad would be costly; many deep cuts and long, high bridges would be required.

Railroad Cost $150,000 Per Mile

Eventually, however, about the time of the Boer war, in 1900, a beginning was made. The undertaking was gigantic. Gorges 800 ft. wide and 100 ft. deep had to be spanned. One span is 120 ft.—the largest brick arch with one exception on any British railway. The total cost of the line was £30,000 ($150,000) per mile. It was opened for traffic in 1905.



General View of Horden Colliery and a Near View of the Washery

In 1899 shaft sinking had started at Dawdon and Easington. There are now four collieries served by the line—Dawdon, Easington, Horden and Blackhalls. Tremendous quantities of water had to be dealt with in all of them before the coal measures were reached. The magnesian limestone, containing salt water, is approximately 650 ft. thick, and between the limestone and the coal measures there is 50 to 100 ft. of running sand.

Efforts to sink Dawdon and Easington by means of bucket-lift pumps were unsuccessful; over 10,000 gal. of water per minute, in one shaft, was encountered, and eventually after long delays the shafts were sunk with the aid of the freezing process. Dawdon did not com-

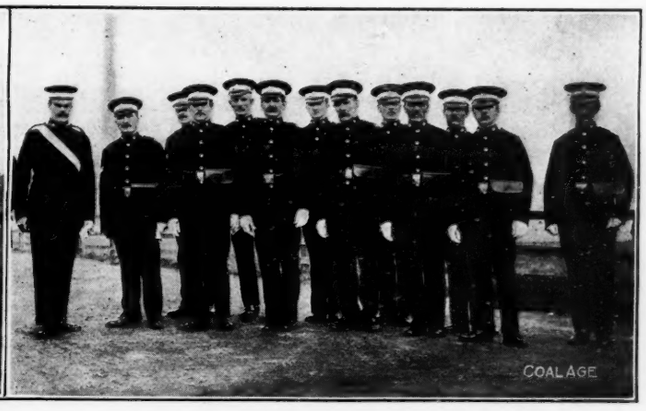
*Victor-American Fuel Co., Delagua, Colo.

Note—Mr. Dean is now traveling through European coal fields, and is preparing a number of articles expressly for "Coal Age."

The Episcopal Church and the Club House

CARNIVAL GROUPS, REPRESENTING THE BRITISH EMPIRE AND AFRICAN TYPES

HOSPITAL NURSES AND FIRST-AID MEN IN CARNIVAL PARADE



THE FIRST-AID CORPS AT HORDEN COLLIERY

mence to hoist coal until 1907, and Easington was still later, beginning only in 1910. The cost of sinking has not been made public, but it was very great.

TOWN OF 10,000 INHABITANTS QUICKLY SPRINGS UP

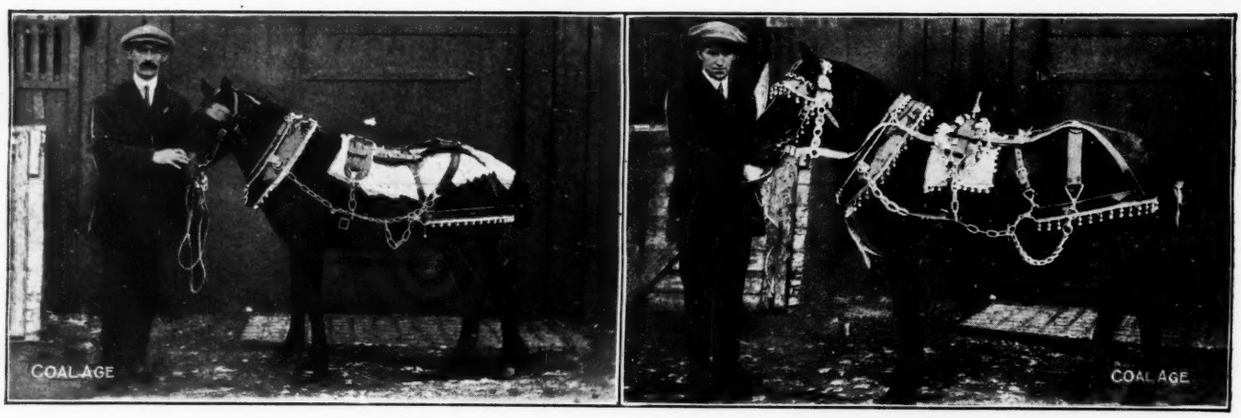
Coal was reached first at Horden, which was producing in 1905, and today there is the town of Horden, with a population of over 10,000, on land which was green fields when I first saw it in 1904. The output per day is 3000 tons, and there are about 3000 men and boys employed. This output of 3000 tons supports a town of over 10,000 men, women and children, with a church, several chapels, schools, picture palaces, clubhouses, three gorgeous public-houses or drinking palaces, coöperative store and over 20 shops. Building is by no means over, and the population is still growing.

The cost of sinking the three shafts at Horden, with 36-in. diamond bucket-lift pumps, down to a depth of 1150 ft. was £380,000 ($1,900,000), and the total amount of money spent at the colliery, including sinking the shafts, making pit bottoms and equipping the surface—including standage for empty and loaded railroad cars—was over £550,000 ($2,750,000).

Easington now looks like it is going to challenge Horden, 2000 tons of coal a day are being raised, and what is most remarkable is the large new towns which these

HORDEN COLLIERY FOOT-BALL TEAM

"PUTTER BOYS" AT EASINGTON COLLIERY



PRIZE PIT PONIES AT HORDEN COLLIERY CARNIVAL

comparatively small outputs support. The architecture and construction is in every way fine, and money appears to have been as plentiful as the water in the shafts.

Four years ago sinking commenced at Blackhalls in the face of unparalleled difficulties. The limestone is 650 ft. thick and contains underground streams. Bucket-lift pumps were employed, and at one time 17,000 gal. of water per minute were handled before the cementation process was adopted, and this has proved quite successful. Two circular shafts, 20 ft. in diameter, have been sunk down to a depth of 1200 ft., and up to date over £350,000 ($1,750,000) have been spent.

Electric hoisting engines have been installed, and the company proposes to erect a garden village surrounding a public park and having a bandstand in the center.

THE CARNIVAL AT HORDEN

A carnival or parade takes place at Horden every summer, for the purpose of raising funds for the local hospital. Prizes are given for the most original costumes or groups, and the pitmen's lassies, with collection boxes, pass around among the spectators.

THE YOUTHFUL PITMAN, FIRST-PRIZE WINNER IN CYCLE PARADE, HORDEN COLLIERY CARNIVAL

The mines are being worked on the three-shift system, and, as the Northern custom is, the first shift of hewers or diggers descend about 4 a.m. Diggers do not always have the same places, lots are cast every quarter, and a man takes his chance of getting either a hard or a soft place to work. This is called "cavilling." The boys who haul or push the coal from the coal faces to the partings are called either "pony putters" or "hand putters." In some thin seams the small ½-ton cars are still pushed by hand to the partings.

The officials and company men are numerous; there are deputies or firemen, back-overmen, fore overmen, master shifters, master wastemen, undermanagers and a general manager. The manager's position is similar to that of the superintendent at American mines, except that he must hold a first-class certificate, and generally his status is higher than that of a superintendent. Managers of the present day are, as a rule, mostly men with a high technical training; owners have evidently discovered that this type of man gives them the best results.

The Lake Freight Rates—The carriers in trunk-line territory north of the Ohio and east of the Mississippi Rivers, filed tariffs with the Interstate Commerce Commission on Oct. 15, 1913, to be effective after approval, advancing rates on all freight, including coal. This action, if made effective, would add 5c. per ton on Lake cargo coal to a rate fixed by decision of the Interstate Commerce Commission, Mar. 11, 1912, which, in its judgment, "from the point of view of the specific cost of doing this particular business, is still too high."

The reason the Lake cargo rate was protested was not for its amount, but that its relation to other competitive districts was not right. The rate fixed by the commission, Mar. 11, 1912, and especially the advance now asked by the carriers, continues that unfair relation.

Those interested are not concerned in the proposed advances on other commodity rates, nor do they object to profitable coal rates from all districts; but are taking the ground that the carriers must first establish a proper and equitable relation among the rates from all competitive districts, so that if additional revenues should be allowed to the carriers, and coal should supply any part, each district would bear its proper share of the burden

The 108th Meeting of the American Institute of Mining Engineers will be held in Salt Lake City, Aug. 10 to 14, 1914 inclusive, with headquarters at the Hotel Utah. Several coal papers will be read at the Thursday morning session. Bradley Stoughton, 29 W. 39th Street, New York, is secretary.

Plumbing the No. 5 Shaft of the Madison Coal Corporation in Illinois

By G. E. Lyman*

SYNOPSIS—Description of a particularly well executed shaft-plumbing operation, using the two-shaft method. Some original and valuable notes on the inaccuracies permissible in this class of work are also given.

In the early days of mining, when it generally required some unusual emergency to induce an operator to have a survey of the workings made, the inaccuracies of the maps were frequently only equalled by the startling crudities of the field method employed. To no part of the work did this apply more pointedly, perhaps, than to the connection of the underground and surface surveys.

The old-time surveyor, equipped with his Jacob-staff and link-chain, was well content to take sights above and below on the hoisting rope, or perhaps a corner of the shaft, and then carry his compass lines forward into the workings with a simple faith that at least did credit to his intentions. With the modern development of mining operations, however, and the necessity of maps in keeping therewith, the several methods of shaft plumbing now in use were gradually introduced until today we have means of handling this critical part of the work that are really astonishing in their accuracy; they also form a most fascinating piece of work for the engineer, as well as an interesting problem for the practical mathematician.

Preliminary Considerations

It may be said, briefly, that all the more accurate methods of correlating the top and bottom surveys of shaft mines, have as their basis the determination of the underground coördinates of two temporary points on the surface survey, which are transferred below by means of plumb lines and carefully tied in to underground stations, so as to form a permanent base line for all future mine traverses. These two plumb lines may be in the same, or in different shafts. Contrary to a somewhat widespread belief it is no special advantage to have them both visible from a point on their line produced, since the old method of "jiggering" to get on line permits of a considerable angular error, which increases with the proximity of the transit to either wire. In fact, this method is not much used now, except to handle the limited amount of development work done before the shafts are connected below.

It is evident that the further apart the two plumb lines are placed, within reasonable limits, the more accurate will be the results. Consequently the usual arrangement of bituminous mines, with their separate shafts for hoisting and ventilation, offer extremely favorable conditions for this work.

It is the purpose of this article to outline briefly the entire operation, with the necessary computations, as performed at Mine No. 5 of the Madison Coal Corporation, at Mt. Olive, Ill., during the regular work of the engineering department. This mine has two shafts, hoisting and air, about 420 ft. deep. Surface obstructions prevent

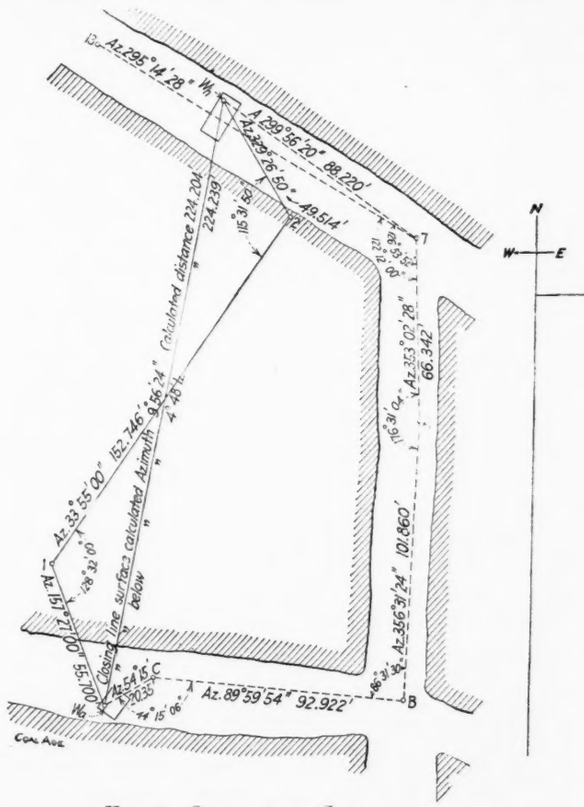


Fig. 1. Outline of Surface and Underground Traverse

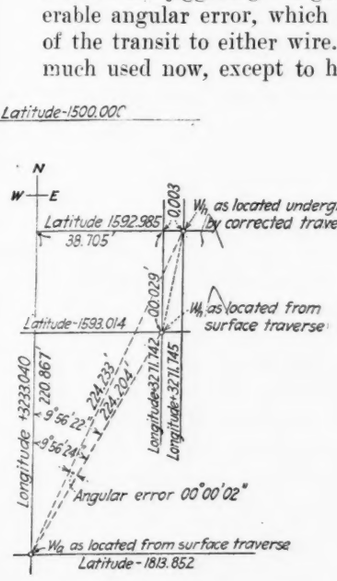


Fig. 2. Sketch Showing Angular and Coördinate Error

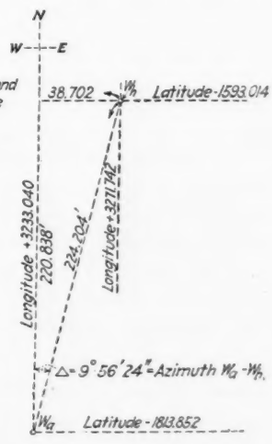


Fig. 3. Determination of Azimuth between Wires

*Mining engineer, Madison Coal Corporation, Glen Carbon, Ill.

sighting between the shafts on top, and the arrangement of the bottom also makes it impossible below.

General Scheme of Procedure

No. 18 steel wire was used for plumb lines, with 60-lb. boiler weights attached below and swinging in tubs of water covered with an inch of black oil. On top the wires were suspended from heavy timbers securely spiked in place. About an hour was required for all vibration and swinging of the wires to cease. It is absolutely necessary, of course, that all work below be suspended, and the fan stopped during the entire operation. Measurements were made with a steel tape 200 ft. long, under standard tension, and compensated for temperature.

Fig. 1 shows a general outline of the surface and underground surveys, the former being shown in solid and the latter dotted. Stations 1 and 2 are permanent surface monuments set in concrete, which have been carefully tied in to the surface traverse. The azimuth from 1 to 2 is 33° 55′ 00″, and the distance is 152.746 ft. From this base line the remainder of the work is carried forward. The wire in the hoisting shaft is designated as W_h, and in the air shaft as W_a; 7 and 13 are permanent mine stations, which are ultimately to form the underground base line.

For the sake of obtaining the greatest possible accuracy, all angles were measured direct from foresights and the azimuths calculated therefrom. Each angle was repeated five times, one-fifth of the final result being taken as the correct value.

The cumulative repetition of an angle is an operation familiar to engineers, but for the information of the student it may be stated that it is necessary to use a transit graduated in azimuth from zero to 360 deg. Then, with the vernier set at zero, a foresight is taken on one line of the angle, the upper motion released and a foresight taken on the other line of the angle being measured. The lower motion is then released, a sight taken on the first point again, the upper motion released and turned to the second, and the process repeated as often as desired. In the measurement of the angle at C underground, for instance, after five repetitions in the manner just described, the vernier traversed the entire circle twice and read 1° 15′ 30″, making the total angle turned $(2 \times 360°) + 1° 15' 30''$, or 721° 15′ 30″, one-fifth of which, or 144° 15′ 06″ is the correct value of the angle.

Computations

The measurements of the angles at Stations 1 and 2 gives us the data on which the following computations are based, resulting in the accurate determination of the surface coördinates.

Fig. 3 shows the right triangle which is formed by the coördinate relation of the wires, with legs 38.702 ft. and 220.838 ft. long, from which the following is derived:

$$\textit{tangent of angle at } W_a = \frac{38.702}{220.838} = 9° 56' 24''$$

$$= \textit{azimuth of } W_a - W_h$$

$$\sqrt{220.838^2 + 38.702^2} = 224.204 = \textit{distance } W_a - W_h$$

The net result of the above is the accurate determination of the azimuth and length of the imaginary line connecting the two wires on the surface.

Returning to the underground work, reference to Fig. 1 shows that a somewhat more extensive traverse is required to connect the wires below. The surface instrument is accordingly set up at C, and the graduated plate brought approximately to azimuth by means of the needle. It is not necessary to do this, however, as any azimuth may be assumed to start with, but the method indicated has the advantage of keeping the subsequent correction within more reasonable limits. The angles are measured, as shown in the figure, by the same cumulative repetition as used in the surface work. At Station 7 an angle is read to Station 13, and the line between the two permanent stations eventually forms the base line for all subsequent underground work.

It should be noted that although this part of the work is referred to an assumed azimuth, the angular relations of the traverse between the wires are as precise as though we already knew the correct azimuth and were working from it.

The accompanying table shows the result of this work, the coördinates of W_a having been taken the same below as previously determined for it on the surface.

Applying the same computations as described for the surface work, we obtain the azimuth for the closing line underground, W_a to W_h, as 4° 48′ 12″, with a distance of 224.233 ft. Obviously we secure exactly the same result here, regardless of the azimuth assumed, or the coördinates taken for W_a below, as the only requisite is that the angular relation of the underground traverse shall be correct in itself.

Our surface and underground work now compares thus:

	Azimuth	Distance
Surface, W_a to W_h	9° 56′ 24″	224.204 ft.
Underground, W_a to W_h	4° 48′ 12″	224.233 ft.
Difference	5° 8′ 12″	0.029 ft.

We find, therefore, that our calculated azimuth for the line connecting the wires below is 5° 08′ 12″ less than the calculated azimuth of the same line on the surface. Consequently it is only necessary to make this correction in the azimuths of the underground traverse between the wires to bring it in precise agreement with the true

SURFACE TRAVERSE

Line	Distance	Azimuth	Bearing	L. Sine	L. Cosine	Longitude	Latitude	Station	Remarks
						+3211.680	—1762.410	1	Permanent surface monument
1-W_a	55.700	157° 27′ 00″	S 22° 33′ 00″E	+ 21.360	— 51.442	+3233.040	—1813.852	W_a	Wire in air shaft
1-2	152.746	33° 55′ 00″	N 33° 55′ 00″E	+ 85.231	+126.756	+3296.911	—1635.654	2	Permanent surface monument
2-W_h	49.514	329° 26′ 50″	N 30° 33′ 10″W	— 25.169	+ 42.639	+3271.742	—1593.014	W_h	Wire in hoisting shaft

UNDERGROUND TRAVERSE WITH ASSUMED AZIMUTH

Line	Distance	Azimuth	Bearing	L. Sine	L. Cosine	Longitude	Lattitude	Station	Remarks
						+3233.040	—1813.852	W_a	Location from surface traverse
W_a-C	20.350	54° 15′ 00″	N 54° 15′ 00″E	+ 16.516	+ 11.889	+3249.556	—1801.963	C	
C-B	92.922	89° 59′ 54″	N 89° 59′ 54″E	+ 92.922	+ 0.003	+3342.478	—1801.960	B	
B-A	101.860	356° 31′ 24″	N 3° 28′ 36″W	— 6.177	+101.673	+3336.301	—1700.287	A	
A-7	66.342	353° 2′ 28″	N 6° 57′ 32″W	— 8.037	+ 65.853	+3328.264	—1634.434	7	Permanent underground station
7-W_h	88.220	299° 56′ 20″	N 60° 3′ 40″W	— 76.448	+ 44.028	+3251.816	—1590.406	W_h	
7-13	245.300	295° 14′ 28″	N 64° 45′ 32″W	—221.879	+104.603	+3106.385	—1529.831	13	Permanent underground station

azimuth as used on the surface work. The azimuth of the permanent underground base line, 7 to 13, was found to be 295° 14′ 28″ as run with the assumed azimuth, and adding our correction we obtain 300° 22′ 40″.

This is the true azimuth of the line 7 to 13, and from it the surveys can be carried out into the workings. The azimuth W_h to 7 may now be corrected, and the true coördinates of 7 thereby calculated, using for this the surface coördinates of W_h. While this completes the connection of the surface and underground surveys, a further study of the figures is interesting.

UNDERGROUND TRAVERSE WITH CORRECTED AZIMUTH

Line	Distance	Azimuth	Bearing	L. Sine	L. Cosine	Longitude	Lattitude	Station	Remarks
						+3233.040	—1813.852	Wa	Location from surface traverse
Wa-C	20.350	59° 23′ 12″	N 59° 23′ 12″E	+ 17.513	+ 10.363	+3250.553	—1803.489	C	
C-B	92.922	95° 8′ 6″	S 84° 51′ 54″E	+ 92.549	— 8.317	+3343.102	—1811.806	B	
B-A	101.860	1° 39′ 36″	N 1° 39′ 36″E	+ 2.951	+101.817	+3346.053	—1709.989	A	
A-7	66.342	358° 10′ 40″	N 1° 49′ 20″W	— 2.109	+ 66.308	+3343.944	—1643.681	7	
7-Wh	88.220	305° 4′ 32″	N 54° 55′ 28″W	— 72.199	+ 50.696	+3271.745	—1592.985	Wh	
7-13	245.300	300° 22′ 40″	N 59° 37′ 20″W	—211.623	+124.048	+3132.321	—1519.633	13	

Checks

The calculated distance between the wires underground is 0.029 ft. longer than on the surface. Practically these distances should be the same; theoretically they should be almost infinitesimally closer together at the bottom, on account of the convergence toward the center of the earth. The calculation and comparison of these distances offers a convenient means of checking the entire work, and the discrepancy in lengths is frequently referred to as the error of the operation, which in the case under consideration would be in the ratio of 0.029 ft. to 224.204 ft., or as one in 7731, approximately. Sometimes the angular error is established by considering its tangent as 0.029 ÷ 224.204, which would indicate that it amounted to 00° 00′ 28″.

However, while satisfactory approximations from a practical standpoint, neither of these assumptions are correct; the accurate determination of the amount of error can only be made by correcting the entire underground traverse, and starting with the surface coördinates of one wire, figure the underground coördinates of the other wire and compare them with the surface location of same. The accompanying table shows this computation in full.

Fig. 2 shows, by means of a distorted sketch, the coordinate relation of W_a to W_h as located from the surface traverse, and W_h as located underground from corrected traverse below. The coördinates of W_h should, of course, be the same below as on the surface, but we find an error of 0.003 ft. in longitude and 0.029 ft. in latitude. This error is a fixed quantity, and will exist in all future underground work.

The azimuth of the closing line underground, as calculated from the coördinates of the corrected traverse, is 9° 56′ 22″ (Fig. 2) showing an actual error of 00°00′ 02″ as compared with the true surface azimuth of the same line. This insignificant error, at first sight, appears to be absurdly small, but a little study of Fig. 2 will show that there could be a considerable coördinate error and yet have absolutely no angular error which could be detected by computation, in which case W_a and the two locations of W_h would lie on the same straight line.

The distance between W_a and W_h figures exactly the same on the corrected underground traverse as it did with the assumed azimuth originally used, which is as it should be, since both results were obtained by purely mathematical processes, into which any error of field work could not enter.

Even the determinations of error given above cannot be said to be precise further than that they represent the total errors of the entire operation concentrated at the wire W_h. It is impossible to take account of any interior compensating error which may have occurred.

It is evident that a modification of this method may be readily applied to two wires in a single shaft, yet the advantage of using two shafts is readily apparent when it is considered that the effective base line (distance between wires) regulates the accuracy obtainable.

High-Production Records

The mines of the Superior Coal Co. have maintained their producing power for the year ending June 30, 1914. These mines, three in number, located in Macoupin County, in the central part of the state, produced, for the year just closed, an average of 11,383 tons per day worked.

The individual records of production for these mines were as follows:

Mine No. 1, produced 754,993 tons, hoisting 217⅞ days, and made an average hoist of 3565 tons per day.

Mine No. 2, produced 887,863 tons, hoisting 225⅛ days, and averaged 3944 tons per day.

Mine No. 3, produced 891,457 tons, hoisting 224$\frac{15}{16}$ days, and averaged 3961 tons per day.

From these figures, it would be fair to say that, had there been no labor troubles in Illinois during 1914, these mines would have produced 3,000,000 tons of coal. This is a good record; but the record for production is not the only thing to commend in the operation of these mines. The records for fatal and nonfatal accidents were equally good, there being three fatal and 23 nonfatal accidents, for the year ending June 30, 1914. The nonfatal accidents were only those that caused the loss of thirty or more days. No. 2 mine has not had a fatal accident for nearly two years; and, in that time, has produced nearly 2,000,000 tons of coal.

The production per fatal accident, for the year just closed, for these mines, was 844,820 tons, as compared with 782,591 tons for the year 1913, the Coal Report for Illinois, 1913, showed 352,407 tons mined, for each life lost. The production of these three mines, per nonfatal accident, was 110,194, as compared with 60,338 tons mined in the state per nonfatal accident.

The mines of the Superior Coal Co. have made a good record since they were opened up, and it would not be surprising if the year 1915 surpassed all previous records. Under the able management of John P. Reese, general superintendent, and John Ross, his assistant, at Gillespie, records have and will be broken. Both men are active in the safety-first movement, and sincere in their efforts to bring about a new order of things whereby mine accidents will be reduced to the minimum and suffering decreased.

Extracts from a Superintendent's Diary

Occasionally, when the pressure from the big bosses' office threatens my nerves, I pull down the roll top and make a trip into the mines. These trips being largely the promptings of impulse, I have no definite route mapped out, but wander about pretty much as the spirit moves me.

Very often I run into groups of men at the mouth of a room, discussing subjects of vital interest to themselves and myself as well, while at other times, I meet men singly and in pairs, at the working face and, because the meeting is free and easy, learn much about their personal affairs as well as their likes and dislikes.

Sometimes on these wanderings, a morning slips by so quickly that I run into a man eating out of a dinner pail without realizing that it is even near noon and, for fear of offending, I sit down and share the contents of the bucket. In this manner I have come to know much about the cooking accomplishments of many of our miners' wives and, incidentally, something about the feeling existing between the woman who prepares the bucket and the man for whom it is prepared.

For example; if the host is a young man from the boarding house, his standing with the landlady's daughter is evidenced by the trimmings in the bucket. Likewise the newlyweds are given to garnishments and other reminders of thoughtfulness.

Old man "Steady" who neither drinks nor beats his woman on pay days, finds no fancy work in his basket, but the delicious jellies and cakes and relishes assure him of the welcome that is awaiting him at the day's end. Possibly when I get him to talking I find that he was born in Scotland, and worked in the mines there when a young man. He remembers his dinner bucket of those days very distinctly; no jellies and pies and cakes (they have no money for such luxuries in the old country) but good plain food and plenty of it.

Then there is old man "Never-do-well." Some of the crumbs and leavings from his bucket are so unpalatable that even the mine rats refuse to keep him company while he is lunching. Of course, he is married to a Mrs. "Never-do-well" or such things could not happen.

Sometimes the Character of the Miner's Lunch Indicates Conditions at Home

Sometimes a scanty, poorly prepared lunch is an indication that back home some great misfortune is being met heroically. Today I learned of such an instance: Our boss driver is married to a girl who has not been able to use either one of her hands for two years. Six months before her marriage she picked up a dynamite cap that her father had dropped at home and in some manner exploded it while holding it; she went to the altar a hopeless cripple just as she is today.

Her own father advised Bruce against the marriage, after the accident, because of the girl's helplessness, but Bruce had only one answer: What's that got to do with her soul? And now, early in the morning and late at night Bruce does the work that those poor maimed hands would have done so willingly, if fate had willed otherwise: Hired help with boss driver's wages are beyond planning.

I learned all this from Bruce himself. I came upon him just as he was finishing his lunch and when I noticed the shape of the biscuits in his pail, I, as tactfully as possible, suggested that he send his wife to the cooking school that some of our ladies have arranged for, next week. This apparent misjudgment on my part, as to his wife's ability, cut deep and so the poor fellow told me the whole pitiful story that I might not misjudge her. Not once during the recital did he intimate that he was deserving of praise or sympathy.

Numbers or Skill in First Aid

By a First-Aid Man

First-aid work has done much during the last few years to relieve suffering and to prevent relatively simple injuries from developing into those of a more serious character. Among mining men, in particular, the influence of first-aid classes has been tremendously helpful in creating a better spirit of understanding between bosses and men, for it is scarcely possible that any man can work alongside his boss trying to learn to be useful in case of an accident without both becoming more friendly. Finally, there comes an immense satisfaction to the man equipped with some knowledge of first aid in knowing that if he does witness an accident, he is capable of being of some intelligent service and is not required to stand by, wishing he knew what to do and yet unable to ease the condition of the injured person.

It would be ideal if all persons were trained in the elements of first aid. In order to promote greater interest in the subject, many very interesting and instructive demonstrations are held each year, and these cannot fail to awaken the interest of the public. However, it is well to call attention at this point to the fact that these demonstrations may fall short of their real purpose.

First aid is not a means for producing a show or a pageant; it is, on the other hand, a splendid movement in the direction of the betterment of all mankind. There is then a certain danger in trying to organize a large demonstration, because it is human nature to seek to emphasize the number of participants rather than the excellence of their work.

It is certainly far better at any place to have a small corps of well trained first-aid men, fully equipped and thoroughly reliable, rather than a large number of men, poorly or only partially trained, rushed through a certain amount of instruction to make them available for some spectacular occasion, and whose very lack of sound training is likely to cause them to look upon the whole first-aid movement as of no permanent consequence.

Before a demonstration, *all* the men, not only the leaders or captains, who are to take part ought to be proficient in all the work to be demonstrated. This can only be guaranteed when proper classes have been conducted, under competent supervision, for a sufficient time to give each man an opportunity to become thoroughly familiar with the work, followed by examinations and practical demonstration by each individual of his ability to treat all the most common cases to which first aid is applicable.

Among the best of the good ideas that have been initiated in recent years, first aid may well be grouped. Its interests, however, like those of the other movements, ought to be well guarded.

The Labor Situation

SYNOPSIS—The Union has gained a victory in the anthracite region, this time over its recalcitrant members who desired to strike in violation of a contract. In Central Pennsylvania, the operators are preparing to sue the Union for permitting those things to be done which the Union has just successfully averted in the anthracite region. In Ohio, some progress toward settlement and a large advance toward peace have been made. At the Bache properties in Arkansas there is the peace which comes when everything combustible is burned or burning. The Bache-Denman Co. and its allies are bankrupt and the coal is burning in two of the mines.

Last week, we stated that the men working at the mines of the Delaware, Lackawanna and Western Coal Mining Department, rejecting the features in the wage scale requiring arbitration, were preparing for a strike. But the Union ultimately got the upper hand and held the men to their agreement. The men from 15 local unions had asked that certain alleged grievances be adjusted. If these grievances could be regarded from any point of view as scale violations, the men were justified in protest and acted within their right. The redresses desired were abolition of the patrol system and an adjustment of the machine-mining rate and to this is now added the recognition of the general committee in any new conditions that may arise at the mines.

REALLY NOT A NEGOTIABLE MATTER

While it was certain that the complaints made by the workmen did not on their face allege violations of the mining agreement, and one demand, at least, was such as could not be conceded by the company still Colonel R. A. Phillips, the vice-president and general manager consented to discuss the questions. In fact there was no other way open. It would not do for one of the parties to an agreement to decide whether the matter at issue did or did not offend against the agreement or was or was not within the bounds of reason and therefore insubmissible to negotiation, and moreover, the agreement seems to anticipate modifications in working conditions not to be classified as violations of the contract and to leave them open to the regulation of the conciliation board.

There were 57 representatives of the locals and the number was soon found unmanageable, so six men were appointed to act for all 15 unions. It was alleged this change was recommended by Colonel Phillips.

Thus far, all was almost regular though strictly speaking the pourparlers should have been between the district officials of union and company. But as Colonel Phillips had agreed to meet representatives of the miners at any time he had no just cause of complaint; nor did he make any but conceded many matters desired of him.

But the grievance committee backed up 18,000 employees believed that it could lay aside the agreement of 1912 and compel Colonel Phillips to grant its demands, without bringing the matter before any conciliation board. To this end the miners voted to give the grievance committee the right to call a strike. Now strikes and lockouts are forbidden under the agreement. If the employees' representatives and their employer cannot agree ,the issue must be taken before a conciliation board, and Colonel Phillips' willingness to hear the grievance of all the unions through their unofficial spokesmen did not compel him to sweep aside the appointed method of adjudicating disputes. In fact the men were at fault in not acting through their district officers as provided. They were disloyal to them, as well as to the agreement. Colonel Phillips therefore refused as was his right to argue the case any more with his men, except before the proper authority.

REALLY THE POVERTY OF THE UNION NOT ITS PRIDE RESTRAINED IT

The union officials, meanwhile, held back. They did not desire, as District President John Dempsey tersely stated, to cross any bridges till they came to them, a habit of caution which has been distressingly frequent with the union at all times. Its duty, too often evaded, is from the first to control the men, preventing all breaches of the agreement.

But even the final pacification of the would-be strikers is perhaps hardly to be credited to the good faith of the union officials. Perhaps it was nothing but the depleted condition of the union funds which really prevented a strike. True the local union had, on June 30, $75,643.67 in the treasury but after all this was only $4.20 for each probable striker should the trouble be strictly confined to the 18,000 in the D. L. & W. employ. As the grievance committee talked of calling out 8,000 more, it is easy to see that $3 would have been the total relief the men could have expected from funds on hand, as the main organization and the American Federation of Labor are practically without a reserve.

The position of the company was further strengthened by the fact that the coal business is so quiet that there is no anxiety relative to the possible idleness of the mines. Prudence therefore was powerful enough in itself to dictate an observance of the agreement. A personal letter was sent however by the D. L. & W. July 29, to all its employees but strange to say this rendered them hostile rather than conciliatory, so unwilling were they to consider the company's side of the argument.

There has been at all times a body of men in favor of an amicable settlement without a strike. These men recognized Colonel Phillips' fairness. Still they believed the new conditions justified the general committee in its independent action and they felt that machine mining and the patrol which were new matters should not be left to the conciliation board. Many of these men failed to vote when the referendum on the proposed strike was taken.

When, on July 31, the district president spoke against a strike as a violation of the agreement, and Colonel Phillips on being interviewed, promised to adhere to all promises made to the general committee, the strike was voted off and arrangements made for the leaving of the whole matter to the company and the district officers. In fact nothing could be more seemly than the declaration of the subcommittee as given to the press. A new atmosphere pervaded the whole dispute.

NESQUEHONING AND NOTTINGHAM

There are two other centers of unrest in the anthracite region, the Nesquehoning colliery of the Lehigh Coal & Navigation Co., and the Nottingham colliery of the Lehigh & Wilkes-Barre Coal Co. In the first the grievance of the "consideration men" is being discussed. When a man used to reach a place in the mine where he could not make money or where the material taken out was not measured, the company paid him $3.34 per day. Recently an effort has been made to pay him by the cars loaded. While some men working "by car work" were satisfied, when a vote was taken some weeks ago, it was found that 90 per cent. of the men were opposed to it.

The men at the colliery have taken up the matter with the company officials in due order and it now goes to the conciliation board at Hazleton Aug. 3. It is a pity that a similar disposition was not made of the D. L. & W. dispute in the earliest stages, before feelings grew so strong as to urge a strike and to suggest a practically new agreement to that already in force.

At Nottingham, the company has supplied, it is stated, a powder of less strength than that formerly employed. As the miners have to pay for their powder, this involves greater expense. There is no reason to believe that this directly assures the company greater profit, but it does probably result in the production of larger coal. The miners talk about carrying the case to court and testing whether the company can restrict the miners to purchasing their powder supplies from the company. Both these issues are important but the action in each case is in accord with the agreement and so creditable to the miners.

SUIT AGAINST UNION IN CENTRAL PENNSYLVANIA

In Central Pennsylvania, the policy of the union of permitting the members to violate the agreement at will has caused the Association of Bituminous Mine Operators of Western Pennsylvania to bring suit against the union. The companies claim an aggregate loss of $200,000. On July 21, the committee of the Association met in Clearfield and decided to move headquarters from Philadelphia to that town.

"PADDY" GILDAY TO JOIN THE OTHER UNION MEN AT WASHINGTON

It is stated that Patrick Gilday of Morrisdale Mines, Penn., is about to accept an office from President Wilson. It will be remembered that Gilday is president of the second district of the United Mine Workers of America and was one of the commissioners of conciliation in the Kanawha strike. While he does not have the magnetic qualities of the other mine

leaders, there is evidence that, at least of late, Patrick Gilday has been a credit to the body to which he belongs. He believes that the contract between miners and operators should not be violated and that any one so doing should be penalized. Only recently, we spoke highly of his attitude and we shall be truly sorry if he resigns.

It is said that Thomas Haggerty of Reynoldsville, Penn., who also figured in the Kanawha strike and who lives in the district, may be chosen as his successor. He is now a member of the National Executive Board representing District No. 2. James Purcell is also seeking the office.

HOCKING VALLEY RESUMES AUG. 3

After being in continuous conference at Columbus for more than a week the scale committee of operators and miners in the Hocking Valley district came to an agreement late Wednesday evening July 29. The question as to which method should be used in weighing coal under the new mine-run law was the cause of the deadlock and the matter in debate was left to the individual corporations and their miners to decide separately. The miners strenuously opposed the plan of weighing the lump and slack separately and since the tipples were old-fashioned that was the only plan that could be suggested by the operators. In some cases the miners have agreed, until the tipples are rebuilt, to estimate that the slack would add 28 per cent. to the weight of the lump coal. In other cases temporary weighing apparatus will be installed. As a result of the agreement practically all mines in the Hocking Valley district will resume operations Aug. 3. The Hocking Valley district mines about 9,000,000 tons per annum, employs about 12,000 men and produces about one-fourth of the whole output of Ohio.

Several minor changes were made in the working conditions of the previous year. Trappers, when they are superannuated miners are to be paid $1.50 instead of $1.25 per day and firemen's wages are to be based on an 8-hr. day.

It is estimated that it will cost in the neighborhood of $12,000 to $15,000 to rebuild each and every tipple in the Hocking and Jackson districts to conform to the requirements of the new law. This will mean an outlay of many thousands of dollars. In some cases where the mines are about worked out the tipples will not be rebuilt and the operations will be abandoned.

POMEROY DISTRICT RESUMES BUT MASSILLON AND CROOKSVILLE HAVE A DEADLOCK

In the Pomeroy district working conditions were adjusted with little trouble and mines are scheduled to start operations at once. The tipple question did not arise in these negotiations as practically all the tipples had been rebuilt during the suspension.

The conference in New Philadelphia of the scale committees of the Massillon district ended in a deadlock and an adjournment was taken until Aug. 4. The Crooksville district also had trouble in settling working conditions. Up to Aug. 1 no agreement had been reached. It is also stated that the Bergholz agreement has been signed.

It is believed that in eastern Ohio trouble with the Industrial Workers of the World is about over. Practically all the pumps and engines are manned and the parades of agitators have ceased, owing to the efforts of the sheriffs in Jefferson and Belmont county who arrested the ring leaders. The sheriffs succeeded in swearing in a large number of deputies to preserve order.

The coal operators mining the No. 8 or Pittsburg seam in Ohio have agreed to meet the miners in joint conference at Wheeling, W. Va., Wednesday afternoon at 2 o'clock. President Albasin, of the subdistrict union, called upon operators in Bellaire Sunday and asked if they could meet the miners. They arranged to enter into conference with them Wednesday morning, Aug. 5, but changed to the afternoon at the request of the miners. Concessions are expected and a settlement is expected to be made before next week.

The agreements in other sections being based on the promise that no concession would be made to eastern Ohio operators, the Union, it would appear, should make an equal concession to the other Ohio mine owners should it permit the eastern Ohio operators to make a more favorable scale. In fact this would be wise, promise or no promise, for the man who sets his price above the market watches the seller pass up the street and makes no sales.

A CONSTABLE CHARGED WITH COMPLICITY TO MURDER

The injunction proved itself unable to save the properties of the Bache-Denman interests because of a deplorable weakness of everyone from the U. S. attorney-general down. There has been too much terrorism on the side of the disorderly and too much maudlinism on the part of the law-abiding. The judge of the court who showed as much courage as any one failed to pass promptly on the contempt-of-court charge against Stewart, Slankard and others.

Now there are further complaints and the contempt case may be reopened or a new case filed. James Slankard, the constable of Hartford, Ark., already charged with contempt is now under indictment for complicity in the alleged cold blooded murder of the two mine guards at Prairie Creek. An employee of the Bache-Denman Coal Co. recently made affidavit that Slankard stood guard over a log house, where the union miners are said to have executed I. Sylesberry and J. Baskin after the all-night fight at Prairie Creek.

FOUR DAYS' RIOT ENDS IN RECEIVERSHIP

Franklin Bache was made receiver of the Mammoth Vein Coal Mining Co., the Coronado Coal Co., West Virginia corporations, the Bache-Denman Coal Co., an Oklahoma corporation, the Hartford Coal Co., the Sebastian County Coal Co., the Denman Coal Co., the Bache & Denman Coal Co., the Mammoth Vein Coal Co., the Mammoth Vein Royalty Co., and the Prairie Creek Coal Mining Co., all Arkansas corporations.

The combined capital of the interests is said to be $1,500,000 and the petition declares the value of the property $700,000. Necessary payments of royalty to T. W. M. Boone, are declared to be the cause for throwing the companies into bankruptcy.

In reciting the reasons for the appointment of a receiver it alleges that on Friday July 17, three of the companies' mines were destroyed in a riot of striking miners. On the next night the Hartford company's Dallas mine, near Hartford was destroyed while on July 20, the Coronado's plant at Arkoal was maliciously fired. It may be added that while the fire in No. 1 has now probably burned itself out, that in No. 3 is still burning and it has probably extended to Mine No. 4, as the mines join underground .

THE SOUTHWEST NEAR SETTLEMENT

On July 21 a joint session of the Southwest Coal Operators' Association and representatives of United Mine Workers of America from Arkansas, Oklahoma, Texas, Kansas and Missouri decided to abolish the existing Arbitration Board of one member and substitute a board to consist of three miners and three operators. The latter board will settle all disputes between employees and employers which are brought before them, without further appeal, though a deputy on the ground will try the case first and adjudicate the matter whose decision will be binding only if both sides assent. This bone of contention being removed, the wage agreement will be taken up by districts.

But great speed cannot be expected in the settlement as there are 3 separate districts; No. 21 comprising Oklahoma, Arkansas and Texas, No. 14, Kansas and No. 25, Missouri.

The Texas understanding is already complete, however, and secures the check-off and the 8-hr. day. The old wage scale is reaffirmed.

STATES OF WASHINGTON AND COLORADO

The miners' representatives in District No. 10 assembled at Seattle, Wash., according to Martin J. Flyzick, their president expect to ask for an increase in wages when the scale is renewed.

The Western Federation of Miners is meeting in Denver, Colo., and on July 27 a special committee reported in favor of a referendum calling for an amalgamation between the W. F. of M. and the U. M. W. of A. The recommendation was for a complete merging of the former in the latter or for a supreme control, the Western Federation being merely a metal-mining department of the larger organization. The Federation adopted this motion on July 31. Committeemen from each body are to meet and propose the merging terms, which will then be submitted to a referendum vote. At the present moment, amalgamation seems assured. Mother Jones is attending the convention.

McDONALD BELIEVES MINERS AND OPERATORS HAVE COMMON NEED

From an unexpected quarter comes a strong adherent of solidarity within the industry. Who would imagine that Duncan McDonald, the hot-headed leader of the Illinois miners, secretary of District No. 12, would argue for operators' profits, and would realize that juice could not be drawn from a squeezed lemon? Addressing the U. S. Industrial Relations Committee he stated that 40,000 of the 90,000 members of the United Mine Workers in Illinois were idle because too many mines had been opened.

These miners were, he alleged, on the verge of starvation, and he stated that the mine workers did not have enough money in their relief fund to meet the emergency. He stated that 18 mining companies failed last year and that there should be a law in the United States which would restrict the opening of new mines. Mr. McDonald did not add, however, that the unions had permitted some of the members to work in coöperative mines for two-thirds of the mining scale,

thus forcing non-coöperative coal-mining operations into bankruptcy.

Equally notable were Edward T. Bent's remarks about the union. Mr. Bent is a member of the Executive Board of the First District in the Illinois Coal Operators' Association and general manager of the Oglesby Coal Co., with an output of about a quarter million of tons per annum. Mr. Bent declared that conditions were better for miners in Illinois than in Colorado or Michigan "because they licked us in 1896."

Mr. Bent desired the centralization of power in the officers of the union believing that while the leaders should be chosen by the miners they should be free to exercise their discretion because their larger viewpoint made them more competent to determine all the issues in a labor dispute.

VANCOUVER ISLAND

The general strike threatened in Nanaimo seems wholly unlikely. The Provincial Federation of Labor declared for it only because the large number of miners overbalanced the judgment of those engaged in other trades. The sentiment is strongly against such a strike. Meantime the strikers have been told that the United Mine Workers will furnish them with no further pecuniary assistance. The union has spent $584,000 in Vancouver but cannot continue such liberality in view of its troubles elsewhere and its present lack of money. There is only $278,000 in the treasury.

Here and There in the Mining Field

There are two districts in Illinois where a combination of explosive gas and coal dust in the mines render mining operations dangerous. One of these is District V, comprising 33 mines in Saline and Gallatin Counties. Most recent statistics for this field indicate that explosions caused 32.1 per cent. of the fatal accidents, which compares with 2.9 per cent. for the state as a whole. Each employee produces an average of 5.1 tons of coal per working day, while the average daily production per employee for Illinois is 4.5 tons. This high rate production per capita is due to the extensive use of mining machines, 90.2 per cent. of the tonnage being mined by their aid.

Nearly all of the coal produced in the United States is mined by the room-and-pillar system, or some modification of it. The longwall method of mining, so well adapted to many thin seams, is neither understood nor appreciated in this country. The only field where longwall mining produces any considerable tonnage is in northern Illinois, in Will, Woodford, Putnam, Marshall, La Salle, Grundy and Bureau Counties. Longwall mines in this district produce over five million tons of coal annually, which amount is about 9 per cent. of the production of Illinois. The production of this tonnage is attended by 24.5 per cent. of the nonfatal accidents in coal mines in the state. The per capita production per employee is only 2.1 tons, as compared with 4.5 tons for the state as a whole. The longwall method of mining makes an almost complete extraction of the coal in the bed, and produces about 15 per cent. more lump coal over a 1¼-in. screen than is produced in Illinois room-and-pillar mines.

Editor Silliman of the "Pottsville Journal" has the following to say concerning government tax on hard coal companies: "The persecution of the anthracite companies by the government has materially retarded prosperity in the anthracite fields. All the companies are kept in a constant state of apprehension, for they know not what move the government may make next, or how radical and untoward it may be. An official of a large coal company a short time ago made the statement that he firmly believed that fully fifty per cent. of his time was taken up with government suits or government investigations.

"The administration seems to believe that there is a popular antipathy against what is colloquially known as the 'coal trust,' and in order to cater to this antipathy the administration believes it to be its duty, from the viewpoint of political exploitation, to make it clear to the public that it is intent upon either destroying the anthracite coal companies, or driving them out of business.

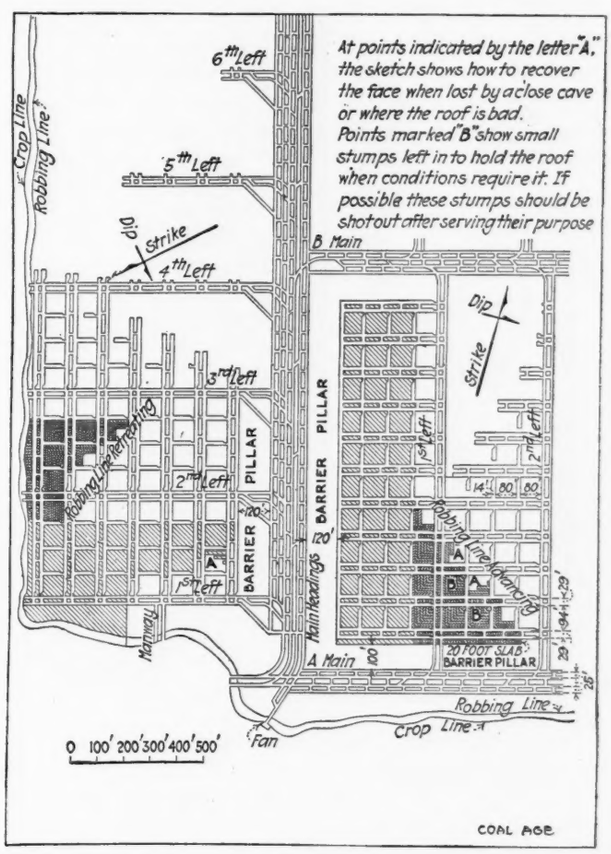
"The American citizen was told at one time that the anthracite companies represented an 'unholy combination operating in restraint of trade.' He has seen the companies go into court and refute these charges. He has seen them set forth that they are doing only what other decent business men do; nothing more or nothing less."

The Hillcrest Explosion

The jury investigating the Hillcrest disaster declared that death was occasioned by an explosion caused by gas and dust. A rider was added by the jury in which they declared that they believed the company had infringed the Mines' Act. They further suggested that the government enforce a monthly inspection of all men working in mines to see that no matches are carried into the mine and that a sufficient supply of life-saving apparatus is kept as near the mouth of the mine as possible.

A System of Mining in Kentucky

The Mineral Fuel Co. has designed a system of mining calculated to meet conditions as they exist in the district where this company operates. On the left-hand side of the accompanying illustration, robbing work commenced at the back end of the first and second left headings. This plan was possible because a development heading was driven from the manway. If the first left heading had been driven from the main heading, the rooms would have been widened to the left and a slab taken from the barrier, as is shown on the right-hand side of the illustration, where all the work is done advancing.


At points indicated by the letter "A," the sketch shows how to recover the face when lost by a close cave or where the roof is bad. Points marked "B" show small stumps left in to hold the roof when conditions require it. If possible these stumps should be shot out after serving their purpose
6th Left
5th Left
4th Left
3rd Left
2nd Left
1st Left
Crop Line
Robbing Line
Dip
Strike
B Main
A Main
Manway
Main Headings
BARRIER PILLAR
20 FOOT SLAB BARRIER PILLAR
Fan
0 100' 200' 300' 400' 500'
COAL AGE

PROPOSED METHOD OF MINING A KENTUCKY COAL SEAM

The model plan shown here is not designed for a single mine, but is a correlation for the conditions in this entire Kentucky field.

Who's Who in Coal Mining

Peter Kooi

The life of Peter Kooi is a fine example of what grit and determination will accomplish for a fellow when he has nothing more material to fall back upon. Losing his parents at the age of seven and starting to work as an errand boy in a Chicago grocery store at the age of eleven, was the inauspicious start of the subject of this sketch. At the age of fourteen Mr. Kooi became a clerk in the store where he was employed, continuing in this capacity for some years until the opportunity presented itself for him to purchase a railroad ticket brokerage business in Chicago.

In 1904, when 38 years of age, Mr. Kooi closed out his ticket business to become interested in a coal-mining property at Monarch, Wyo. He traveled out to this western

PETER KOOI

state to accept the job of secretary, treasurer and general manager of the Wyoming Coal Mining Co. at Monarch. Two other men with himself owned all the stock of this corporation.

In 1906 Mr. Kooi sold his interest in the Wyoming Coal Mining Co. and in the early spring of 1907 opened up his present property at Kooi, Wyo. Here he has developed a mine with 1800 tons daily output, and having a capacity of nearly double this present production. He owns the town bearing his name and supporting a population of about 400, and is also sole proprietor of the general store, catering to the wants of all these people.

Mr. Kooi never participated in politics, his entire time having been devoted to the particular line of work in which he has been engaged. He is not a hard man to get along with, as is evidenced by the fact that he has never been plaintiff or defendant in a lawsuit.

At one time he was president of the American Ticket Brokers' Association, and is ex-president of the Northern Wyoming Coal Operators' Association. He is a Mason, member and past-potentate of Kalif Temple Mystic Shrine, Sheridan, Wyo., member B. P. O. E., Sheridan, and member of the Rocky Mountain Coal Mining Institute.

Mr. Kooi possesses many admirable traits of character, but no quality in the man is more noteworthy than his ability to attend strictly to his own business, never meddling with affairs that are not his concern. He is the sort of man who must be boss where his interests lie, but he is not ambitious to dictate the policy his competitors, neighbors or friends must follow.

Handling Explosives

Among the recommendations of the Inland Steel Co.'s Book of Rules, relative to the handling of explosives, are the following, slightly modified to suit coal-mining conditions. With other changes and additions, such as the individual needs of each plant readily suggest, they will be found useful for posting around almost any mining operation.

(1) No one shall be allowed to handle or assist in handling high explosives in any way until he has received instructions satisfactory to the superintendent or mining foreman.

(2) Great care should be taken in handling and opening boxes of dynamite. Use a wooden mallet and a wooden wedge. Avoid friction and blows as much as possible and never open the box in a storage house or magazine.

(3) Suitable carrying boxes to hold not over 50 lb. of dynamite, and to have a self-closing cover should be provided for all men handling dynamite. The words, "For Dynamite Only" should be plainly stenciled on each box.

(4) Dynamite carrying boxes for open-pit work should be made as near frost proof as possible.

(5) No explosive should be taken into any mine except in a securely covered case. Explosives and caps should not be transported together.

(6) No explosives should be carried in electrically operated cars.

(7) Dynamite, fuse or caps should not be left in a wet place, or permitted to lie around loose in working places.

(8) Do not smoke or carry a paraffin or oil lamp in your hat when handling dynamite or caps, or when making up cartridges, as hot grease or oil may drop on the caps or powder and cause an explosion. Place your lamp 2 or 3 ft. to one side.

(9) Skewers are furnished for the use of all miners handling explosives and no other instrument should be used for inserting the fuse.

(10) Caps are extremely sensitive to heat, friction or blows. Do not drop them or strike them against any hard body. Do not lay them where they may be stepped on and do not carry them in your pocket.

(11) Place caps on fuse at the place where they are stored, and never near dynamite or powder.

(12) When crimping caps the greatest care should be taken not to squeeze the explosive composition. They should never be crimped with the teeth; there is enough composition in one of these small capsules to blow off a man's head. Cap crimpers must be used in all cases.

Editorials

Plenty to Sell But No Way to Deliver

One of the most important effects the European war will have on the American coal industry will be the opening of the markets of South America to United States coal. Never before have we had brought home to us so forcibly the need of a merchant marine. With our mines, our farms and our factories able to supply the world with fuel, food and clothes, we are seemingly unable to send our products abroad and profit by the fortunate position we occupy in this unfortunate affair. We trust the present Congress will relieve this situation at once and provide the money and authority to purchase ships and solve the greatest problem that now confronts us as a nation.

The Rate Decision

The long awaited decision of the Interstate Commerce Commission in the railroad rate case, has been handed down. The decision is favorable to the railroads in tone, contains some good advice and holds forth much hope for the future, but as to its immediate effect, the findings of the commission are not likely to benefit the roads in any very substantial way. Whereas the railroads asked for increases that would have yielded them $50,000,000, annually, the decision promises only about $14,000,000 a year increase.

Railroad men generally were disappointed in the decision. They say that if they cannot raise rates, they cannot increase wages, nor continue extensive improvements. One thing is sure, the Eastern roads will not find it easy to materially increase their capital because they will not be able to increase their earning capacity.

As for coal and coke, the ruling of the commission expressly forbids any increase in rates on these two commodities, and since these minerals with iron ore furnish more than 50 per cent. of the tonnage on some roads, the 5 per cent. increase, even in the central territory, is allowed on only a part of the freight tonnage.

The best thing about the decision is the commission's mere recognition that the railroads need relief.

Hydraulic Stowing

American coal operators would benefit greatly if they would adopt some of the ideas of European colliery managers concerning the hydraulic filling of worked-out areas underground. The chief advantage of this method of mining lies in the fact that it entails no new danger (so often found in new departures), and it can be employed to considerable advantage in most mines working thick, or moderately thick, seams, under a surface that must be preserved.

In hand-stowing as hitherto practiced, the rooms and entries can be packed only up to 45 per cent. of the space, while by hydraulic stowing, 90 per cent. of the space is filled. From this fact it follows that hydraulic stowing requires more than double the material used in packing by hand.

The time is not far off when all culm piles and waste dumps will have disappeared, because they will serve as feeding material for the hydraulic filling. After all these available piles are utilized, the question of how to obtain sufficient material for stowing will arise. If a blast furnace is near, the problem will be partly solved, for granulated slag is an excellent stowing material. If no furnace is nearby, the mining company may have to bring in its material by rail (perhaps in conjunction with other adjacent companies).

As to the kind of piping best suited for flushing material into mine workings, opinion is divided. Unlined mild-iron pipe is perhaps best suited where the flushing material is small and the consequent wear triffling. This type of pipe has a longer life for this work than that of steel. At a German colliery where different types of piping were used, the mild-iron pipe carried 60,000 tons of blast-furnace slag with the least wear. This style of pipe is generally manufactured with loose flanges, so that it can be turned several times before it is quite worn out.

Wrought-iron pipe with porcelain lining is also used successfully at several continental collieries. The porcelain used is of the very best, with a degree of hardness of 8, so that it can stand the roughest material.

In Germany, about 100 mines have introduced hydraulic stowing. In Belgium, about 10 mines use this same system, while in France a number of mines in the black-coal field have adopted the flushing system.

Hydraulic filling is therefore no longer in the experimental stages, and should be carefully investigated by all coal companies whose mines are subject to gob fires, or where there are excessive losses of coal and timber under present methods. Of course, this system finds its greatest use in thickly populated districts, where surface subsidence must be prevented.

With regard to the cost per cubic meter of stowing, or per ton (which is almost the same), it has been found that this amounts to about 29c.

The Duty of the Buyer

The coal buyer is gradually realizing that on him partly rests the burden of economy in mining. He cannot be brought too soon to realize that coal is a mineral which cannot be pried loose from its bed without breakage, and which is mixed with impurity so that it cannot be purchased as free from admixture of undesirable constituents as can an artificial article.

The buyer has been disposed to accept nothing but a No. 1 product. It would be better if he would frankly meet the situation, especially as regards the condition of the coal as received. All coal will probably be sold eventually in one of two forms, either pulverized or as slack. When all coal goes to market in one of these two conditions the whole problem of mining will be changed.

The operator today is endeavoring to keep his fuel in a lumpy condition and is wasting much money to that end. It is a manifest folly, and a stop should be put to that endeavor by changing the demand of the market before too much money is needlessly wasted.

The marketing of coal for domestic uses should entirely cease, for it places an entirely unnecessary burden on householders, involves great expense to the middleman and much delay to the city in the collection of ashes. It would be better for all houses to be heated by gas distributed under a pressure at least 10 times as high as that now customary. In this way smokeless combustion could be assured. The difficulty is that the present-day gas producer is only really successful where the best of fuel is used. There is evidence, however, that in the future, finer coal and less pure will be used in the gas producer.

The electrification of railroads will also favor the greater use of slack or pulverized coal. It is remarkable how the railroads have failed to take advantage of electrical train traction and to put themselves abreast of the times. To their credit, be it said that, though keen bargainers in a coal trade, they have deplored rather than condemned the price of coal. But they have done a great deal to make coal mining unprofitable by continued demand for a high grade of mine-run and an unwillingness to accept slack.

Advances in the coal industry are quite liable to be along the wrong lines if the coal buyer does not speedily arrive at his ultimate demand. If it is slack or dust which is really needed, why equip a mine with undercutting machines and use such precautions as having cars with low side boards, so that large lumps must be saved for building up the sides if a full load is to be secured? If fine coal is needed, the ingenuity of manufacturers should rather follow Gen. Edward O'Toole's lead, and the pneumatic transportation which he has put in execution is the natural sequence.

And when the railroad is reached, if dust is to be shipped, tank cars, loaded and unloaded pneumatically, are the natural *desiderata*. The labor and cost of unloading will thus be minimized. And when fine coal is the end sought, probably a pneumatic separation will replace washing and gravity methods. The effect of this change on the cost and facility of bunkering vessels at the dock and in the high seas would be revolutionary.

In fact, to know what is ultimately sought makes true efficiency possible and saves intermediate journeyings to that goal. If we are approaching a time when there will be as little need for nut and lump bituminous coal as there is now for broken anthracite, we should speedily realize it and hurry the day along, for every step to accommodate mining to present inefficient conditions is mere lost motion. The duty of the buyer is clear, but will be plainer yet if the seller points it out to him.

The Storage of Coal

In view of the immense demands of industries such as gas-making, etc., where one works will use from 1000 to 2000 tons of coal a day, the question of a proper method of storage is important.

It is generally conceded that no air-stacked heap—whether under cover or in the open—should be piled to a greater height than 20 ft. When this rule is violated, dust pockets are likely to occur, resulting in ignition or spontaneous combustion. For this reason, when 20 ft. is to be the maximum height of the stack, the storage capacity is limited to about 20,000 tons per acre of ground space.

By adopting the wet-storage method, that is, storing under water, the capacity per unit of ground area can be more than doubled. It is likewise true that when submerged, coal does not vary much in temperature and does not deteriorate greatly, due to the gases being more or less confined, thus preventing general oxidation.

Another consideration in wet storage is the prevention of breakage, the pulverization being reduced by the water forming a cushion between the various lumps.

Submerged storage, of course, is not without some disadvantages. The system entails a considerable initial expense, due to the necessity of constructing a substantial reinforced-concrete reservoir. A further consideration is the cost of pumping machinery for emptying and filling purposes. It is furthermore a fact that coal subjected to storage is usually found to be brittle and somewhat dull in appearance. The latter effect is superficial, and on drying in the sun rapidly disappears.

Probably the best method of storage is that known as the "mixed method," where a supply of coal is stacked in the open and an emergency supply is stored under water. The latter supply may stand for 5 or 10 years, and will be found to have deteriorated to only a very slight extent.

Much depends on the locality where the coal is to be stored. If the neighborhood is congested and the price of land high, submerged storage will afford relief by increasing the capacity per unit of ground. If the coal is to be used for gas-making purposes, arrangement should be made as far as possible to set the coal aside for drying before using. This is not so essential when the fuel is used for steam-raising or for firing purposes.

Many engineers believe it is better to carbonize a wet coal giving a slightly increased yield of impurities, than an air-stacked coal which has lost perhaps 10 per cent. of its gas-making value.

Our Export Trade in Coal Negligible

The gross annual export of bituminous coal from the United States (to countries other than Canada), including that used for bunkering purposes, aggregates only 13 million tons. This is not a very important volume of trade when viewed in the light of our total production of 570,000,000 tons annually. Therefore, if we were to lose our entire export trade, the American coal industry would suffer but little. On the other hand, the doubling of our present foreign coal business would hardly be felt by the industry at large. The chief possibility our coal companies have to fear is the general slackening of business throughout the nation, that may result from such a general conflict in Europe.

The imports of goods into the United States aggregate a billion dollars annually. This business nets this country approximately $200,000,000 each year. It is evident therefore that if the war blocks our foreign trade, United States revenues will be curtailed so greatly that our government will probably have to issue bonds to pay current expenses.

Legal Department

Coal Dealer's Remedy against Defamation

By A. L. H. Street*

There is an interesting court decision sustaining the right of a coal dealer to recover damages for libel or slander affecting his business. It is an opinion of the Wisconsin Supreme Court, reported at page 225, Vol. 105, *Northwestern Reporter,* in which the court upheld the right of a retail coal company to recover damages against the mayor of a city, if he falsely stated in a public address that the company not only charged extortionate prices for fuel, but refused to sell at all to persons suffering from illness. This decision reads as follows:

"A corporation may sue for a slander or libel upon it in the way of its business or trade. There can be no doubt that the published letter, which forms the basis of the second cause of action, was libelous per se under the circumstances set forth in the complaint. It charged, in substance, that at a time when there was a coal famine, and people were suffering for fuel, the plaintiff, though engaged in the business of selling coal, not only charged extortionate prices for its coal, but actually refused to sell coal, even at these prices, to people suffering from sickness. Such a charge is libelous, because imputing mean and abhorrent conduct to the plaintiff in the conduct of its business, and thus tending necessarily to injure it in such business.

"It is claimed, however, that, while the words may be libelous when written and published, the same words do not constitute slander per se when spoken, and that there is no sufficient allegation or special damage—hence that the first cause of action is subject to demurrer. This contention also must fall. Words spoken of a person in direct reference to his business or trade, which charge him with incapacity, fraud, trickery, dishonorable or mean conduct in the transaction of his business, thereby necessarily tending to injure him in such business, are actionable without proof of special damage. There seems to be no need of further discussion of the subject."

In this connection it is to be noted that there is abundant judicial authority for saying that any false statements written, printed or spoken of a coal dealer, which on their face tend to injure him in his trade or business, are actionable without proof of special damage if they accuse him of fraud, dishonesty, insolvency, refusal to pay his just debts, the commission of a public offence or any thing tending to destroy his business.

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Recent Judicial Decisions

Miner's Duty to Remove or Prop Rock—In removing coal from the side of an entry from beneath a rock, a miner is bound to either first remove the rock or prop it, and cannot recover for injury resulting from his failure to do so. (Kentucky Court of Appeals, Wallsend Coal & Coke Co. vs. Shields' Administrator, 167 "Southwestern Reporter," 918.)

Risk of Injury Not Assumed by Employee—A miner does not assume the risk of injury growing out of negligent failure of his employer to keep appliances in proper condition, unless the danger is known to him or is obvious to a person of ordinary intelligence. (Kentucky Court of Appeals, Ohio Valley & Coal Mining Co. vs. Heine, 167 "Southwestern Reporter," 873.)

Proof of Agency to Buy Coal—In a suit to recover the price of coal, defended on the ground that the person to whom the coal was delivered was not defendant's agent, as claimed by plaintiff, mere declarations by the supposed agent are not admissible to establish his agency for defendant. (Texas Court of Civil Appeals, Kohlberg vs. Awbrey & Semple, 167 "Southwestern Reporter," 828.)

Damages Recoverable for Wrongful, but Innocent, Removal of Coal—When a coal operator wrongfully, but innocently, removes coal from the land of another, the damages recoverable against him are to be measured by the fair value of the coal in place at the time of taking, as determined by its royalty value. (Pennsylvania Supreme Court, Stark vs. Pennsylvania Coal Co., 88 "Atlantic Reporter," 770.)

Mine Driver's Duty to Discover Obstructions—That a mine driver failed to discover an obstruction in an air course does not show that he was guilty of such negligence as bars his right to recover damages for personal injuries sustained by him in consequence of such obstruction, in the absence of a showing that he would have discovered the obstruction had he maintained a reasonable lookout. (Alabama Supreme Court, Sloss-Sheffield Steel & Iron Co. vs. Russell, 65 "Southern Reporter," 137.)

Duty to Provide Props for Miners—The fact that a miner remains at work after failure of his employer to furnish props as promised, does not preclude the right to recover for consequent injury to him, unless the danger of continuing work was so apparent that a person of ordinary prudence would not have encountered the danger. Nor does the fact that he might have safely worked at other places than where roof fell upon him conclusively establish his guilt of contributory negligence. (Kentucky Court of Appeals, Continental Coal Corporation vs. York's Administrator, 167 Southwestern Reporter, 131.)

Commodities Clause of Interstate Commerce Act—The commodities clause of the Hepburn Act cannot be construed to prohibit a railway company to carry coal for a coal company organized by it to buy the product of its miners at the breakers, where it owns no stock in the coal company, having sold the greater part thereof to its stockholders, by whom much of the stock has been resold to outsiders. (United States District Court, District of New Jersey; United States vs. Delaware, Lackawanna & Western Railroad Co., 213 Federal Reporter 240.)

Amounts Recoverable for Injury to Mining Employees—Eight hundred and fifty dollars was not excessive recovery for injury to a coal mine driver where he was confined to his bed for three weeks, and the muscles of one of his legs were permanently impaired, although the leg was not broken. (Kentucky Court of Appeals, Kentucky Midland Coal Co. vs. Vincent, 166 "Southwestern Reporter," 800.) And it is held by the same court that $1000 was not too large recovery for injury to a miner in another case where his leg was broken and rendered shorter than the other. (Big Branch Coal Co. vs. Sanders, 166 "Southwestern Reporter," 813.)

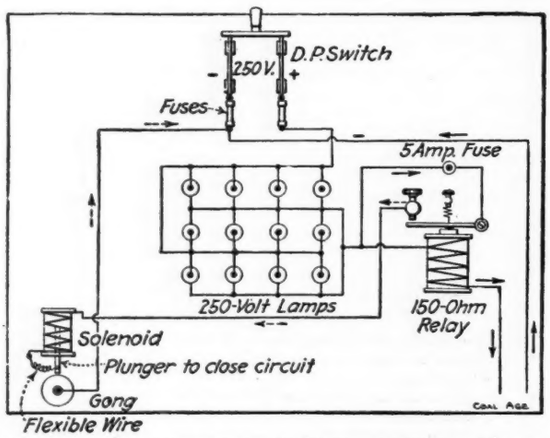
Requirements of Missouri Law Concerning Hoisting Apparatus—Although the Missouri Mining Statutes require the operators of coal mines to provide as safe means as possible for hoisting miners, they do not make an operator an insurer of the safety of employees while being hoisted, the duty being merely to use a reasonable degree of care to maintain the equipment in reasonably safe condition. Negligence on an operator's part is not to be inferred from the mere fact that injury resulted to an employee from a defective condition of a cage; it must also appear that the operator had actual or constructive notice of the defect. (Kansas City Court of Appeals, Ronchetts vs. Northern Central Coal Co., 166 "Southwestern Reporter," 876.)

Discussion By Readers

Mine Signaling

Referring to the mine-signal system described by Mr. McCune, COAL AGE, July 25, p. 149, permit me to suggest that the use of relay No. 2 and the mercury cup are unnecessary for the successful working of the system he suggests. While this system is not new in mining practice, its advantages are obvious. The installation of such a system, however, should be marked with all the simplicity possible.

The accompanying diagram shows the arrangement of the switchboard for the operation of the same system,



IMPROVED ARRANGEMENT OF SWITCHBOARD IN AUTOMATIC SIGNAL SYSTEM

with the elimination, however, of relay No. 2 and the mercury cup. In this diagram, as long as the main circuit remains closed, the branch circuit designed to operate the solenoid and ring the gong will be open. Should anything now occur in the mine to break the main circuit, relay No. 1 is rendered thereby inactive, and, the vibrator being released, flies up and closes the branch circuit operating the gong through the solenoid. This very much simplifies the system and reduces the expense of equipment and upkeep.

ELECTRICIAN.

Pittsburgh, Penn.

The Chemist in Coal Mining

I read the article, "The Chemical Laboratory in Coal-Mining Work," by R. E. Rightmire, COAL AGE, July 18, p. 110, with more than usual interest. The ideas he has expressed agree with mine in every particular. As chemical work in connection with the coal industry is of growing importance, I beg to add a few remarks drawing attention to what constitutes a good coal chemist and what he may be expected to accomplish that will prove of practical importance in the industry.

There are a comparatively few men engaged in the coal industry who thoroughly understand and appreciate the necessity of the services of a good chemist, in any of the operations where coal is mined for domestic consumption, gas or coke making, or even in the preparation of coal for the market. Too often is the work of the chemist, in this line, regarded with suspicion and incredulity; while a more intimate knowledge of the matters in his control, on the part of the operator, would prevent many of the blunders that continually reduce dividends.

Briefly, then, the requirements of a good coal chemist, aside from a general chemical training, are that he must have made a specialty of coal and have studied its geological and physical properties in connection with its chemical analysis. Besides making the ordinary chemical analyses of coal samples and determining the heat values of different coals, the coal chemist must be able to apply his knowledge in such a way that it will prove of practical benefit from a commercial standpoint, as, for instance, in the drawing up of specifications and contracts for the purchase of coal. He must understand the action and deleterious effect of every constituent of the coals offered in the market, so as to discriminate intelligently in respect to their relative economy for the purpose intended. In municipal-contract work, the coal chemist should be the supreme judge.

In respect to a gas-coal proposition, the chemist estimates the practical yield of gas in cubic feet per ton, as well as the B.t.u. of the gas generated per pound of coal, and the same item per cubic foot of gas. He must also determine and report the composition of the volatile matter, and especially the percentages of hydrogen sulphide and carbon dioxide, explaining the effect of these constituents when present in gas intended for fuel or lighting purposes.

In respect to a coking proposition, the chemist determines within reasonable limits the yield in coke per ton of coal, the volume of gas produced, pounds of ammonium sulphate, pounds of crude benzol and gallons of tar per ton of coal, in the modern byproduct coke-oven system. In this respect, the chemist is often able to give much important information based upon the analysis and test of a diamond-drill core; although, as is well understood, the quality and character of the coal may vary in different parts of the seam; and, for that reason, such samples should be taken from different prospect holes. While it is freely admitted that the results of many laboratory tests are not fully realized in practice, such results may be taken as a standard of the efficient yield of the coal in question.

In the preparation of coal for the market, either by washing or by the dry process, the chemist can, by a sink-and-float test and a careful analysis, determine the efficiency of the operation. It often happens that, in washing coal, much good coal is lost that should have been saved and utilized by further treatment for the production of gas or other purpose. The tailings or refuse may contain valuable minerals. It may not be necessary to wash all the coal; certain sizes may pass some specifications without washing. It may surprise an

operator to find that 50 or 60 per cent. of the coal mined does not require to pass through the washery. When it is necessary to remove the sulphur from coal, it is generally important to know whether this exists in combination with iron, as FeS_2, as a sulphate, or as organic or free sulphur. This information will also make known the best means to be adopted for its removal.

A competent coal chemist should be well posted on the coals of the world and be able to classify them. He should be informed, in respect to tonnage, quality and price of coals in different markets, so as to be able to advise intelligently on export business. I firmly believe that a chemist having the qualifications I have mentioned could make himself valuable, on a commercial basis, in any operation where coal is produced or consumed in large quantities.

A COAL AGE READER.

Joliet, Ill.

Magnifying Supposed Evils

Pessimism is a bad habit, and, while it is well to consider a matter from all sides, it is a great advantage to be able to regard, first and foremost, the bright side of every proposition. Coal mining is no exception to this rule. When trouble arises it is, of course, much easier to magnify the difficulties than to say "It might have been worse," and set oneself vigorously to the task of making the best of a difficult situation.

In reading the article entitled "Effect of the Mine-Run Law, COAL AGE, July 25, p. 155, I was forcibly impressed with the fact that the writer of the article greatly magnified the supposed evils of such a law. From his account, one would be led to suppose that there was an utter lack of mine discipline and regulations; and that, instead, the men were turned loose in the mine to shoot and dig coal when and where they saw fit and to load whatever material came first to hand.

Under such conditions, one might expect coal to be shot off the ribs, whereby creep and mine caves would result in much damage both to the mine and the surface, together with the loss of much valuable coal. Mine accidents would be increased, and the records would tell of mine explosions. Calamities are bad enough when they occur, without imagining evils that should be avoided by maintaining suitable discipline and taking necessary precautions in the operation of the mine.

After reading the article of our friend from Kansas, I feel like reassuring him by the statement that all of *our* coal in this district is "run-of-mine." While I cannot say anything in regard to the price the company receives for this coal, I *am* in a position to state fully the conditions that exist in the mine, as a result of employing this method of mining. I would say that fully 90 per cent. of our miners are foreign-speaking men, and while some are fairly good workmen others are very poor. However, we maintain discipline in the mine and suitable regulations are enforced to make the operations of mining the coal quite safe. The headings are driven and rooms turned according to a regular plan, and all pillars and stumps are removed as the work is finished.

Although the conditions in many of our mines are as bad as those that exist in other mines, and although the roof is at times as bad as any I have seen in my 30 years of experience in mines, and although we have clay veins and bony coal and other impurities in the seam, the men do not load an excessive amount of dirty coal. In this district, thousands of acres of coal have been taken out, and yet, with the exception of the draining of a few springs, the surface looks just as good as before the coal was mined.

Though I do not pretend to know much about the new mine law to which correspondent refers, I feel that much of the evil he fears will come to pass can be mitigated and the difficulties avoided, if proper attention is given to enforcing the balance of the law regulating mines.

THOS. HOGARTH.

Heilwood, Penn.

Co-operation in Mining

There has been much discussion recently in reference to the qualifications of a mine foreman. Of the various arguments advanced, about the same number favor the *technical* man as the *practical* man, for this position. One advocate will warmly commend the college man and state good reasons why such a man should be chosen for the position of mine foreman, instead of a practical man with no technical knowledge of mining. Others, again, condemn the practice of giving a position of responsibility in the mine to any other than a practical and experienced man.

Personally, I believe that a mine foreman should possess both practical and technical training. This is especially necessary in order that a man shall succeed as foreman of a *small* mine, where his duties will include not only the handling of the men but the performance of work requiring some technical knowledge. In a larger mine, the foreman is relieved of many of these duties, which devolve on specially trained men who are placed in charge of the different departments. *A little technical knowledge is as essential to the success of a practical man as practical knowledge is to the success of a technical man.* Indeed, theory and practice are a good combination.

But men are not made to order, and the operator must generally choose from the best at hand, who represent two classes. Compare, for example, the man who has set for himself a high standard of achievement and worked manfully and sacrificed much to obtain a college education, in order to better his condition—compare such a one with the man who has continued to work faithfully in the mines, plodding along day after day, and been slowly promoted from one position to another, until there is scarcely a branch of work connected with mining with which he is not familiar. Both of these men have noble qualities and high ambitions. Is it possible for an operator to choose between these two classes of men without doing one or the other of them an injustice? Would it not be better to so arrange their work and duties that they can coöperate by *pooling their resources* and abilities. To illustrate my meaning, I will recite one or two instances.

I recall the case of a contractor who bid on small jobs of carpentering, stonework, bricklaying, excavation, etc. While not eminently successful, he made a good living; but later, desiring to take a larger contract, which included concrete work, of which he knew little, he formed a partnership with a man who had little experience in practical work but who had made a study

of concrete construction. This man knew the strength of concrete; he knew the proper proportion of gravel and cement for various classes of such work. In other words, he was well posted on the theory of concreting. The partnership succeeded because these two men POOLED THEIR RESOURCES.

I remember a man who worked in a street-paving gang. He knew more about paving than his employers; he figured their estimates, laid out their work, which was done in a workmanlike manner. He could not undertake such work himself alone, for lack of capital. Later he went into business with a man who had the capital but not the experience, and together they succeeded, because they POOLED THEIR RESOURCES.

Again, in the same brickyard, there were two foremen, both having equal authority. One of these men knew clay; he knew its nature and how to make it into bricks; he knew how to burn the bricks; but he was no judge of the bricks after they were burned. The other man knew little or nothing of clay and less of the burning of bricks; but he *did* know a well burnt brick when he saw one. He knew the quality and strength of burnt bricks. He could judge of these from their appearance, color and ring. He knew how bricks should be handled, stored and transported, and he had complete charge of this end of the work. These two men succeeded, also, because they POOLED THEIR RESOURCES.

In the same way, the practical man and the technical man can succeed in the mine, if they learn to coöperate. The mining industry has much to learn in this respect. By keeping our eyes open, our minds unprejudiced and profiting by observation, one can improve his own methods. Coal mining needs both the practical and the technical man, provided they are willing and able to POOL THEIR RESOURCES.

GEO. N. LANTZ.

New Straitsville, Ohio.

Borderland Coal Co.'s Plant No. 2

We respectfully call attention to the article entitled "Plant of the Borderland Coal Co.," July 25, p. 141, and beg to advise that, with the exception of the scraper conveyor recently installed by the Webster Mfg. Co. to bring coal from the middle seam to the main conveyor, we designed and constructed the No. 2 plant of the Borderland Coal Co., complete, including the foundations.

PITTSBURGH COAL WASHER CO.,
per Lee Lewellyn, Chief Engineer.

Pittsburgh, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

MATTER

Definition—Matter is the tangible substance occupying space and endowed with properties that give to it form, motion and other distinguishing characteristics, by virtue of an all-pervading or impressed subtle force generally described as electrical.

Divisions of Matter—Until recently, the ultimate or smallest conceivable division of matter was assumed to be the **atom** (Dalton, 1808). Later researches of radio-active substances have developed the infinitely smaller particles which have been termed **"electrons"** (Stoney, 1891) and **"corpuscles"** (Thomson, 1897). The electron is assumed to be a minute particle of matter having a negative charge of electricity; and its mass is variously estimated at from $^1/_{1700}$ to $^1/_{2000}$ of the mass of the atom of hydrogen.

The chemical divisions of matter are the familiar **atoms** and **molecules.**

Properties of Matter—The universal attribute of all matter is that described as **"mass,"** which may be simply defined as amount of matter. By virtue of its assumed electrical state or condition, all matter is endowed with certain tangible and measurable qualities or properties, such as **weight, inertia, density, elasticity, cohesion, divisibility, impenetrability, expansion, contraction.**

Matter undergoes many changes but is absolutely indestructible.

Law of Attraction—The universal law of attraction is that every particle of matter attracts every other particle of matter, the force of attraction varying inversely as the square of the distance between the particles.

Terrestrial Attraction is the attraction that the mass of the earth exerts on the mass of a body. This is commonly called **"gravitation"** and the attractive force, the **"force of gravity"** or simply **"gravity."**

Form or State of Matter—All matter exists in one of three different forms, namely, **solid, liquid,** or **gaseous.** The same matter may pass from one form or state to another owing to a change in density.

Molecular State—The molecular theory assumes that all matter, solid, liquid or gaseous, in respect to its physical condition, is composed of molecules, each complete in itself. It is assumed that these molecules are subject to two opposite or opposing forces known as the **"molecular forces"** of attraction and repulsion.

Molecular Attraction, acting to bind the molecules of matter together, is in obedience to the common law of attraction in all matter.

Molecular Repulsion, acting to drive the molecules of matter apart, is the result of a state of incessant molecular vibration, which produces the effect called **"heat."**

The Coal Age Pocket Book

Solids—Matter in the solid state is characterized by a greater or less rigidity of its molecules. The force of molecular attraction is here stronger than that of repulsion, and the molecules are held in a firmer grasp.

Liquids—In the liquid state, the forces of attraction and repulsion are about evenly balanced, and the molecules move freely amongst each other.

Gases—In the gaseous state, the repulsive forces are in the ascendency and the molecules are driven so far apart that the density of the matter is reduced to that of a gas.

Liquids and gases are both **fluids,** which is a general term applied to any form of matter other than a solid.

Illustration—Ice, water and steam furnish a good illustration of how the same matter can pass successively from the solid to the liquid and gaseous states. In the passage from one state to another, there is no change in the matter itself, the difference being due to the heat condition of the mass.

In the passage from solid to liquid, or from liquid to gas or vapor, heat is given out; and, vice versa, heat is absorbed when a gas or vapor becomes a liquid, or a liquid becomes a solid. The change is thus a heat condition only.

Vapors and Gases—The term **vapor** properly describes the gaseous condition of most substances that, at ordinary temperatures, exist as liquid or solid; or a gas at or near its point of liquefaction. The term thus has a suggestive meaning of the possible liquid or solid state of the substance now in the gaseous state.

The term **gas,** on the other hand, is a general term that relates solely to the gaseous condition of matter; and is thus more properly applied to those substances that, at ordinary temperatures, exist as gas; although they may be liquefied or solidified by a decrease of temperature and an increase of pressure.

Thus, we speak of air, oxygen, hydrogen, nitrogen, carbon dioxide, methane, etc., as "gases," in contrast to steam (water vapor) and the vapors of such volatile liquids and solids as naphtha, benzine, camphor, and other similar substances.

Vaporization takes place at all temperatures; and, in many instances, a substance will pass directly from the solid to the gaseous condition, without becoming liquid.

Mass, Volume, Density—Since mass is amount of matter, the mass (M) of a body is the quantity of matter it contains, which is determined by the volume (V) of the body and the density (D) of the matter. The relation of these elements is expressed by the formula

$$M = VD$$

Then, considering a unit volume (V = 1), it is evident that the **"unit of mass"** is equal to the **"unit of density."** In other words, whatever is taken as the accepted unit or standard of density is also the unit and standard for the measurement of mass, which is the ultimate unit.

Inquiries of General Interest

Ignition of Firedamp by Signal Wires

My attention was drawn to the item on the ignition of firedamp by sparks from an electric bell, which appears in COAL AGE, June 13, p. 977. The article stated that a fatal accident in South Wales had been traced to the ignition of firedamp by sparks from an electric bell in use for signaling purposes.

The bell was described as an ordinary one of the trembler pattern, operated by an induction coil and a battery of eight Leclanché cells, which, when tested after the accident, gave a pressure of 11½ volts. The same item states that it was proved experimentally that sparks from the bell operated with current from the same battery would ignite an explosive mixture of coal gas and air, and that this mixture was later fired by sparks caused by rubbing a file across two wires connected to a pair of cells giving only 4 volts pressure.

The use of an induction coil with a battery of eight Leclanché cells for the operation of a trembler bell is a curious combination. Granting, however, that the circuit is to be opened at the bell, it would be gratifying to know what were the voltage and amperage delivered by the secondary current of this particular coil, under the working conditions, which must, of course, include the leakage of the wiring system and the inductive resistance of the circuit. It may be remarked, incidentally, that the pressure and strength of the current delivered at the point where the circuit was opened and necessary to produce an arc at that point, would depend on local conditions.

It would also be of interest to know if the statement at the close of the item, that an explosive mixture of coal gas and air was fired by the sparking of a current of 4-volts pressure from a pair of Leclanché cells, can be verified. It would be of the greatest interest to know if there are conditions under which mine gas and air, in any explosive mixture, can be ignited, that would seem to call in question the results of the tests made by the Federal Bureau of Mines.

I might add that *it is not possible to get discharges from Leclanché cells, at 4 volts, that will approximate the discharges at this voltage that are now recognized as being safe in the presence of mine gas.* It will be generally agreed that this subject bears an important part in determining the safety of electric mine lamps of all makes. Its thorough investigation would be of the greatest benefit to all concerned.

FRANCIS A. POCOCK.

Philadelphia, Penn.

In this connection, the article entitled "Gas Ignition by Electric Sparks," by W. M. Thornton, published in COAL AGE, Vol. 2, pp. 685, 722 and 796, will be of interest. Mr. Thornton, who is professor of electrical engineering, Armstrong College, Newcastle-upon-Tyne, England, has given much attention to this subject. In his article, Mr. Thornton shows that for the higher voltages, say 100 volts or greater, a current of a single ampere or less will suffice for the ignition of explosive mixtures of marsh gas and air; for lesser voltages, the current necessary for ignition of firedamp rapidly increases. He states: As the voltages are decreased below 50 volts, the current necessary to insure ignition, on the breaking of the circuit, increases very rapidly. Attention is also drawn to the fact that the metal of the terminals, whether iron, nickel or copper, varies the results.

Mr. Thornton adds: "It would appear to be impossible to ignite even the most explosive mixture of methane and air, by single-break sparks from a signaling circuit, at the maximum pressure of 20 volts allowed by the British Coal Mines Act. At these low voltages, electrical signaling may be used with safety in any part of a coal mine, provided that care is taken to prevent wires from remaining in contact and thus forming a short-circuit. Such a contact would cause the wires to become red-hot where they touch, but this is unlikely to occur." We shall be glad to receive further information on this subject. The subject of the influence of electrical currents, conducted into the mine, for power, lighting or for signaling purposes, upon explosive mixtures of gas or dust and air, is one of growing importance and should receive immediate and careful investigation.

A Surveying Problem

Will you kindly give the solution to the following question? I have a block of coal, in a seam pitching 28 deg. due south. This coal is opened by a gangway driven due east. At a certain point on this gangway, a heading has been driven 90 ft. to the rise. Owing to a heavy fall of roof which had closed the gangway, it is proposed to start a slant road from a point on the gangway, 200 ft. outby from the mouth of the heading. The problem is to determine the length and the grade of the slant road, such that it will intersect the heading driven up the pitch, at its face.

JOHN WILLINGHAM, Fireboss,
T. C. I. & R.R. Co., No. 4 Mine.

Belle Sumter, Ala.

The slant road forms the hypotenuse of a right triangle whose respective sides are the heading, 90 ft., and the gangway, 200 ft. The length of the slant road, measured across the pitch is then

$$\sqrt{200^2 + 90^2} = \sqrt{48{,}100} = 219.3 \text{ ft.}$$

The inclination of the seam being 28 deg., the vertical rise of the face of the heading above the gangway is

$$90 \times \sin 28^\circ = 90 \times 0.46947 = 42.25 \text{ ft.}$$

Then, calling the grade angle of the slant road a,

$$\sin a = \frac{42.25}{219.3} = 0.19266; \text{ and } a = 11^\circ 06'$$

Since the tangent of this angle is 0.196, the slant road has a grade of 19.6 per cent.

Examination Questions

Questions for Examination of Mine Electricians*

Ques. 1—What is a miter gear?

Ans.—Two bevel gears of the same size, each cut on an angle of 45 deg.

Ques. 2—What is a consequent-pole motor?

Ans.—A motor having two field coils and four poles.

Ques. 3—What is a differential compound-wound motor?

Ans.—A motor with the series and shunt field connected in such a manner as to oppose each other.

Ques. 4—What is a horsepower and what is its electrical equivalent?

Ans.—A horsepower is the power required to raise a weight of 33,000 lb. through a vertical distance of 1 ft. in 1 min.; or a weight of 330 lb. through a height of 100 ft. in the same time. This is expressed as 33,000 ft.-lb. per min. Electrically, 1 hp. is equivalent to 746 watts.

Ques. 5—What is meant by the drawbar pull of a locomotive?

Ans.—The drawbar pull of a locomotive is its tractive force; or the force a locomotive exerts to pull a load along the track. This force is determined both by the power of the locomotive and the adhesive effect of its wheels to the rails, and is limited by either of these factors separately. In mining practice, the drawbar pull of a locomotive is commonly taken as one-fifth of its weight; and with ordinarily good track and rolling stock, the load hauled on a level road will be from eight to ten times the weight of a locomotive, or, say from 40 to 50 times its drawbar pull.

Ques. 6—Why does a compound motor race when the shunt-field circuit is broken?

Ans.—There are two conditions that may be explained as follows:

1. If the motor is running without load when the shunt-field circuit is broken it will race, for the following reason: A motor always tends to develop a counter-pressure in its armature almost equal to the impressed voltage, and this counter-pressure depends on both the speed of rotation and the magnetic field. Breaking the shunt current at once weakens the field and the motor speeds up in an effort to adjustment. This increase in speed is accompanied with an increase in counter-pressure, which, being opposed to the impressed voltage, still further weakens the armature and series-field current and results in a still further increase of speed, the action being cumulative, which effect, in electrical language, is termed "racing."

2. If, on the other hand, the motor is running under a heavy load when the shunt-field circuit is broken. it will likely stop for lack of sufficient torque to turn the armature. This causes, at once, a large drop in counter-pressure in the armature, and an excessive curent results, in most cases blowing out the fuses or circuit-breakers or, otherwise, burning out the armature.

Ques. 7—What is an interpole motor?

Ans.—An interpole motor is one having small poles between the main poles of the machine, the purpose being to reduce the field distortion and permit the motor to run at a higher speed with less danger of sparking at the brushes.

Ques. 8—(a) What is meant by the pitch of a screw? (b) What is the U. S. standard for a screw ½ in. in diameter?

Ans.—(a) In a single-thread screw, the pitch is the distance between two consecutive threads, center to center, measured in the direction of its axis. In a double-thread screw, the pitch of the screw is twice, and in a triple-thread screw, three times this distance. Always, however, the pitch of the screw is equal to the distance the screw advances or travels, in the direction of its axis, in a single revolution or turn.

(b) The U. S. standard for a screw ½ in. in diameter is 13 threads to the inch.

Ques. 9—Have you ever observed a motor start up in one direction and then reverse itself; and, if so, explain what would cause this to happen.

Ans.—When a compound motor is started under no load, the shunt circuit naturally takes the larger current; and if, through a faulty connection, it happens that the shunt and series fields are bucking each other, the motor will start to rotate in a direction determined by the shunt current, which, for a time, predominates. But, when the motor takes its load, the major current will flow through the series circuit, with the result that the direction of rotation will be reversed.

Ques 10—For what purpose are the grooves cut on an armature shaft, next to the bearing?

Ans.—The purpose of the grooves is to prevent the oil of the bearings following the shaft to the armature, as this would destroy its action.

Ques. 11—Assuming a motor having four poles and but two coils, should the connections be such that the current will traverse these coils in the same or in opposite directions?

Ans.—The direction in which a current traverses a coil determines the north and south poles of the magnet. It is necessary that these poles alternate as north and south poles in the magnetic field. In order to accomplish this, it is further necessary that the current should circulate about the coils in the same, clockwise or counter-clockwise direction.

Ques. 12—Would it be possible to operate a four-pole motor having two coils, with one of the field coils removed?

Ans.—The motor would probably continue to run, but its operation would give less satisfaction. The removal of one coil from a two-coil motor would result in the production of a less torque, while the speed of the motor would probably be increased.

*Note—The above questions have been suggested by Frank Walker, chief electrician of the Pine Run Co., Vandergrift Heights, Penn., as suitable for the examination of mine electricians, whom he says must combine both mechanical and electrical knowledge.

Coal and Coke News

Washington, D. C.

The long-expected decision of the Interstate Commerce Commission in the so called advanced rate case was delivered by the Commission on Saturday, Aug. 1, late in the afternoon. The report covers the whole question of advanced rates on railways as affected by the application of four years ago which was then refused, and as affected by the application which has been under consideration and is now settled.

It is an interesting fact that the rate decision in a number of cases refers to mining products and assigns them a treatment different from that accorded to other items of freight. In dealing with the application for higher rates, the report now delivered says, after reviewing the general character of the problem:

Protests against a general increase in freight rates were presented by the railroad commissions. Protests against proposed increases in rates so far as they affect specific articles, of which the tonnage in some cases is large, were presented by many shippers, and particularly by shippers of coal, coke, ore, brick, cement, lumber, ice, sand, gravel, paper, pulp, corn products and petroleum.

The commission reviews the merits of the argument quite fully and reaches the conclusion that the roads in eastern territory are not receiving a satisfactory revenue and that they ought to be permitted to obtain more through an increase in rates. The claim, however, is made that there is a good deal of difference between the New England territory, the Central freight association territory and other portions and that a different treatment in these is required. Dealing specifically with the question of an advance the commission exempts mining products from the application of higher rates, saying:

We have seen that the class rates in central freight association territory are on a lower scale than can be found elsewhere in the country and that many of the commodity rates are too low and are probably unremunerative, considering the diviserfied nature of the traffic. The class rates and many of the commodity rates may therefore with propriety be increased. This approval, however, is subject to the following limitations:

(a) With respect to certain heavy commodities, namely, brick, tile, clay, coal, coke, starch, cement, iron ore, and plaster, protestants made such a showing as to constrain us to hold that the carriers have failed to sustain their burden under the statute.

(b) Reference has heretofore been made to the fact that the proposed tariffs are based on a minimum increase of 5 cents per ton on all commodities moving under rates stated in cents per ton when less than $1 per ton; with respect to certain hauls, this would result in increases much in excess of 5 per cent. and in certain cases these would be as high as 50 per cent. The carriers have failed to establish the propriety of this minimum increase, and the evidence offered by the protestants makes it clear that it would work hardships and discriminations and cannot be approved, since under it a disproportionate burden is cast upon the heavy short-haul traffic.

There is an interesting point in the portion of the report which deals with those railways which are largely engaged in the carriage of mining products. Attention is called to the fact that the coal carrying roads are very prosperous and then to methods that may be employed by the railways in general for the purpose of economizing their outlays. In this connection attention is called to investigations not heretofore announced, conducted by the Bureau of Mines. The Commission says:

Fuel is, next to wages, the largest item in operating expense. The railroads of the United States report their aggregate fuel cost to be about $250,000,000 a year. But the actual cost is much greater; for the reported figures do not include, ordinarily, the cost of hauling the fuel on the lines of the carrier by which it is used. Furthermore, the cost of coal is increasing.

Much has been done in recent years by means of mechanical devices and otherwise to reduce fuel costs. Thus the Baltimore & Ohio since 1910 reduced its coal consumption 9½% per unit of freight traffic moved. But it has been demonstrated clearly that by knowledge and care on the part of employees and the management much greater savings can be made. With the assistance of the Bureau of Mines, questions were framed calling upon the carriers for details bearing upon this subject. Other investigations are being made by the Commission.

In closing the Commission says: "The contention of the carriers is that upon investments in property amounting to approximately $640,000,000 since 1910 no commensurate return has been made, and that the net operating revenue between 1910 and 1913 shows an actual decline. Additional capital cannot be expected on the showing made on the last increments of investment. . . . . It is not necessary to say that on such a showing the investing public will hardly be eager to entrust its funds to transportation enterprises."

Investigation in Illinois Fields

Additional information has been made public by the Interstate Commerce Commission with respect to the investigation it has lately been carrying on regarding the operations of railroads in the Illinois coal fields with regard to the control of coal deposits in their interest or in the interests of officers of the different lines. The Commission devotes special attention to the New York Central and its officers, giving a long detailed account of the operations of W. C. Brown, of the New York Central in connection with these lands and the companies which operated them. The central factor in the discussion is the O'Gara Coal Co. and the connection between that concern and Mr. Brown, of the New York Central. On this subject the commission after lengthy study says:

Neither W. C. Brown nor his associates can escape severe criticism for permitting these practices to exist. The Commission deems as significant the attitude of Mr. Brown and Mr. Carstensen in the matter of the payment to the O'Gara Coal Co. of the $60,000 rebate described elsewhere. In testifying before the Commission, Mr. Huddleston, the general auditor, took upon himself the entire responsibility of that transaction, and asserted that his superiors did not authorize or even have knowledge of the payments. Mr. Brown and Mr. Carstensen specifically denied any knowledge of the $60,000 rebate and appeared shocked that such conditions should prevail in their organization. A singular phase of the situation is that no one connected with the New York Central lines except Mr. Huddleston pretended that he had authority to make such a payment. . . . .

On various occasions the New York Central officials have had under consideration plans for the consolidation of all the coal properties in the Harrisburg district associated with the New York Central lines. Briefly, the plan contemplated that the Chicago & Harrisburg Coal Co., owned by the Big Four, would issue bonds guaranteed by that road and purchase from the latter its coal lands and from the Saline County Coal Co. and O'Gara Coal Co. their mines and lands. There was then to be formed an operating company, to which the mines and part of the lands would be leased for operation.

W. C. Brown and other officials testified that this plan never received serious consideration and in all probability would never be effected. It is worthy of mention, on the other hand, that in the latter part of 1913 the capital stock of the Chicago & Harrisburg Coal Co. was increased from $55,000 to $1,500,000, and that the company began taking over the coal lands owned by its parent firm, the Big Four Ry.

Whether this is the beginning of a gigantic coal proposition involving the purchase of the Saline and O'Gara properties, and based on the credit of the New York Central lines, the record does not disclose. Such a use of railroad credit for the private ends of favored individuals should obviously receive, if carried out, the severest condemnation of the law.

HARRISBURG, PENN.

The declaration of war against Servia by Austria-Hungary and the call to the colors of aliens in this country is likely to have a serious effect on the coal-mining industry of this state. Reports received here, some of sensational trend, go so far as to say the mines of the state will have to shut down. But many operators take no such view.

It is thought that but few mines will be vitally handicapped by the absence of those who will answer the summons to return and fight the battles of their native land.

In one district in the Wyoming region out of 8000 employees 222 are Austrians and 57 are Hungarians, or a total of 279, who might be subject to Austria's call; 283 employees are Russians and 3400 are Poles and Lithuanians, or a total of 3683, who are or have been under Russia's flag.

These figures make a grand total of 3962, or near 50 per cent. of the men employed in the one district, which is a fair estimate. On the face this would appear to bear a serious aspect, for if half of the men in the mines were to return home, and it might be said that these figures are fairly representative of both the anthracite and bituminous regions, surely the industry would be severely crippled and perhaps made helpless.

But a closer analysis is reassuring. In the first place, it is estimated that half these 3962 men are either naturalized or have taken out first papers. It is regarded as highly probable that a few of these will hasten to return, for the threat of exile to them will bear as stern a face as it will to those whose homes are still across the sea, and who have sent large

sums of money abroad and are afraid that the investments they have made in their native country will be impaired, if they do not answer the summons. With reference to the Austro-Hungarians, even the consuls admit that probably no more than 30 per cent. of these subject to military duty will obey the call to arms.

As to French and German miners the number is negligible. There are many Italians, in certain sections of the state, but there are no signs that many of them expect to leave. English and Welsh miners for the most part are pretty well Americanized.

The coal operators are not seriously concerned as yet over the possible scarcity of labor, for they doubt the prospects of facing any such wholesale departures as would come before suspension of operations would be necessary. It is estimated that at the most 15 per cent. of the mine employees are likely to abandon their places in the mines for the battlefield.

The European situation is not expected to have any direct effect on the market. Of course a general business depression superinduced by whatever struggle may be brewing would have the usual deteriorating influence on the demand for coal.

While it is not yet known to what extent war will effect the mines of the state, operators say the labor market will become acute if Russia makes a call. The subjects of the Czar outnumber those of Franz Joseph, these two countries having furnished a large portion of the coal-region immigrants for a number of years past.

PENNSYLVANIA

Anthracite

Forty Fort—The famous suit of the Trustees of the Proprietors of Kingston Township against the Lehigh Valley Coal Co. has been finally settled and the money paid over, the trustees now having over $100,000 in the bank. The use to which the money is to be put has not been determined, but it will likely be invested or kept at interest until two similar suits now pending are disposed of. One of these is against the Kingston Coal Co. for a tract in Kingston Township, and the other against the Lehigh Valley Coal Co. for a small tract in Forty Fort.

Pittston—Judge Garman handed down a decision on July 31, in the suit of Jacob McCollum against the Pennsylvania Coal Co., wherein he refused a motion for a new trial. McCollum was employed as a miner, and while working in a chamber was struck by cars pushed by an electric locomotive, was run over and sustained the amputation of one of his legs. He charged the company with negligence in that the locomotive was not properly equipped with a headlight, and that he had no warning of approach. At the trial McCollum secured a verdict of $5546. The court sustained this verdict.

Nanticoke—A mistake in the signals to stop the ascent of the carriage at the Bliss colliery of the Delaware, Lackawanna & Western Coal Co., on July 31, resulted in the heavy carriage being carried over the sheave wheel. The beams upon which this wheel rested were splintered and the shaft tower demolished. The colliery has been forced to shut down until the tower can be repaired which will probably take about 10 days. In the meantime the coal from the Espy tunnel and the Loomis colliery will be handled at the Bliss breaker, but the shaft will be out of commission.

Mahanoy City—The Philadelphia & Reading Ry. tracks at the west end of this city dropped out of sight on July 28, just before the arrival of a passenger train with four coaches and a pullman. Miners going home from work discovered the cave-in and flagged the train, causing great excitement among the passengers. The breach was caused by the roadbed falling into abandoned workings of the Tunnel Ridge mine. Some of these mines have not been operated for 20 years, and evidence of surface settling has often been noticed despite flushing.

Parsons—An effort is being made to induce the Delaware, Lackawanna & Western Coal Co. to donate to the Wilkes-Barre park system a piece of land along the Miners Mills road. This consists of about three acres, and is so situated that it is almost necessary for the city to possess in order to carry out its plan in connection with the improvement of Hollenback Park. The land in question is said to be of no particular value to the company, but would be of great value to the city.

Larksville—Operations were suspended on Aug. 1, for 10 days or more at Nottingham No. 15 colliery of the Lehigh and Wilkes-Barre Coal Co., in order that necessary repairs may be made to breaker machinery and inside pumps. The company machinists will push the work as rapidly as possible to the end that work may be resumed within the time stated.

Bituminous

Marianna—Marianna, which has been dull for some time, or since the closing of the mines and the bank, is regaining some of its activity. The mines have been reopened, and hundreds of men who were out of employment last winter and spring are at work, and prospects of a revival of business in the community are bright. Since the closing of the bank and the shutting down of the mines, business has been practically at a standstill.

Charged with having violated the bituminous coal-mining laws, Anthony Chievereno and Edward Jones, both employed at the Rachel mine of the Pittsburgh-Buffalo Co., were placed under arrest on July 31, and when arraigned waived hearings for court. The accusations against the men are made by C. F. Byrne, mine inspector of the 21st district. Chievereno was charged with carrying "the makings" for cigarettes and other smokers articles beyond a point in the mine where only locked safety lamps are allowed. Jones faces a charge of having passed a danger signal into a section of the mine where he should not have gone.

Fredericktown—George Hanko has brought action against the Vesta Coal Co. for damages to the amount of $10,000 for injuries sustained in the Vesta No. 5 Mine. Hanko sets forth he was employed as a track and road builder and was crushed by a motor driven by an inexperienced man. He also alleges that this motor had no headlight, and gave no warning of its approach. He alleges that the company made no provisions for safety holes and that he had not been given instructions as to danger.

Pittsburgh—D. W. Kuhn, and the Fidelity Title & Trust Co., of Pittsburgh, were, on July 30, named receivers for the Pittsburgh & Westmoreland Coal Co. The action, it was stated, was deemed advisable in order that the company might refund a note issue of $900,000, which was due Aug. 1. The company has a capital of $3,000,000 and bonds to the amount of $5,000,000.

Ebensburg—Certain Lilly (Penn.) residents and local union No. 1284 of the United Mine Workers of America have filed exceptions with the prothonotary at Ebensburg against the granting of a charter to the Miners, Laborers and Tradesmen's Union, of Lilly. They allege that those petitioning the charter constitute less than one-third of the total number of men employed by the Piper Coal Co., at Lilly. The filing of the exceptions is believed to be preliminary to an effort to adjust the differences which now prevent a settlement of the strike at the Piper mine.

WEST VIRGINIA

Charleston—The Winifrede coal mine resumed operation, July 30, after being idle on account of a strike since June 1. It had been intended to start this mine on July 27, but a delay was occasioned by a misunderstanding.

The case of the Lehigh Coal Co. operating mines near Morgantown in Monongalia County, against the Buckhannon & Northern Ry. Co., before the public service commission, was compromised by the parties interested and an entry of settlement has been made in the record of the commission.

Morgantown—The School of Mining at the University of West Virginia, is now an accredited training station for mine rescue and first-aid work. The school has installed considerable equipment for use in demonstration and in teaching rescue and first aid in connection with other courses. A class of five men were recently examined and passed and will duly receive certificates.

KENTUCKY

Mater—The Elkhorn Coal Co., of which J. H. Hall, Lexington, Ky., is manager, is making increases in its output and will soon be shipping a large tonnage. Increase in the working force was made Aug. 1. An additional 100 miners' houses are under construction.

Whitesburg.—Cincinnati people have begun a big coal development between Cornettsville and Viper, on the main line of the Lexington & Eastern in the Perry County field. Several hundred acres, it is stated, will be developed, including several timber areas. The promotors are, it is stated, to build a first class mining town at once.

Waverley.—The Drury Coal Co. has lost the case before the Interstate Commerce Commission, in which it sought to have the rate of $1.47 per ton on soft coal from its mines to Chicago held unreasonable. The Miles Brothers Co. asked the commision to change a rate of $1.15 per ton on coal from Kentucky points on the Straight Creek branch of the L. & N. to Chattanooga and lost also. The commission dismissed both suits.

OHIO

Cincinnati.—Operators are considerably interested in a plan involving the consolidation under one organization of the coal-distributing companies in Cincinnati, Cleveland, Columbus, Dayton, Toledo and other Ohio cities, with a capitalization of $10,000,000. It is understood that the com-

pany will be known as the Ohio Consumers' Company, and that it will have its headquarters in Cleveland. This is said to be the idea of a group of Chicago capitalists, who organized a similar combination in that city.

Columbus.—The Maynard Coal Co., which recently increased its authorized capital from $200,000 to $350,000, has absorbed two former subsidiary firms known as the Pomeroy Coal Co. and the Jackson Mining Co. The combined output of the mines now controlled by the Maynard Coal Co. is 2500 tons daily.

The Victoria Coal Co. has purchased an interest and has been appointed general sales agent for the East Kentucky Coal Co., of Torchlight, Ky. The general sales offices of the firm, in charge of Daniel H. Hitt, which were removed to Cleveland about a year ago have again been moved to Columbus, as it is found to be a more advantageous point. The concern has a number of mines in the Hocking and Crooksville districts.

INDIANA

Terre Haute—The demand for coal at Indiana mines is apparently better especially in domestic grades. The retail dealers in most cities which use the Indiana product are enabled to offer at lower prices than for several years in mid-summer and there is some response to this proposition

Clinton.—A cyclone recently blew down the tipple of Crown Hill mine, No. 1, owned by the Clinton Coal Co. The mine is about worked out and the remaining coal will be taken through neighboring mines.

Boonville.—Fire has broken out in the Warrick Coal Mining Co.'s mines east of this city. After unsuccessful efforts to extinguish the flames, a canal is being dug 30 ft. wide and a mile long around the burning mass. The fire started from a shovelful of hot ashes thrown on surface coal by an engineer. No attention was paid to the small blaze that sprung up.

ILLINOIS

Herrin.—The Oak Ridge mine, formerly of the Southern Illinois Coal & Coke Co., which was recently purchased by the Taylor Coal Co., is to be abandoned on account of the expensive upkeep, caused by squeezes and falls. This mine produced a coal that was recognized as a leader, throughout the Central West, on account of its quality.

Trenton.—For the past three or four weeks prospectors have been busy drilling test holes southeast and southwest of this place, in an effort to ascertain the thickness of the remaining portion of the Trenton vein. It is claimed that there are still several hundred acres of this coal in a body that can be worked.

Zeigler—A recent fire at the mine here caused operations to be suspended for practically two weeks.

MISSOURI

Rich Hill.—The Atlas Coal Co. has completed an 800-ft. well, which insures an adequate water supply in the future. The water is soft and especially suitable for steam purposes.

KANSAS

Mulberry.—The Clemens Coal Co. has purchased the farm of J. E. Lewis, near Mulberry, for $18,000 and is sinking drillholes preparatory to active development.

Frontenac.—The Jackson-Walker Coal & Material Co. has authorized the Whitmer Contracting Co., of Philadelphia, to operate a steam shovel and strip the coal on both sides of the Cherokee & Pittsburgh mine No. 15 west of Frontenac.

Pittsburgh.—Coal companies operating in the Pittsburgh field are much interested in the possibilities of making their land valuable from an agricultural standpoint. It is believed that the coal men could with little trouble grow enough fodder for their animals, instead of importing it or buying it on the market, as heretofore. The plan outlined will be thoroughly tested in Crawford and Cherokee Counties.

Topeka.—The state Public Utilities Commission settled the mine run coal case on July 28 by refusing to allow the operators to ship mine run at slack rates. The order of the commission allows carriers to establish screen specifications, providing in substance that slack coal rates shall apply on nut, pea, slack and screenings that will pass through a bar screen with 1⅝-in. openings, or through round holes 3-in. in diameter.

OREGON

Medford—A 13-ft. bed of high-grade semi-bituminous coal has been struck at the Little & Burr mine near this place. According to the owners this will mean the establishment of a new industry in the Rogue River Valley. The fuel contains but little sulphur, and will be well adapted to gas manufacture.

FOREIGN NEWS

Dordmund, Germany—Fifteen coal miners were killed July 28 by fire which broke out in the Hansemann Pit. Six of the bodies were quickly recovered.

Cardiff, Wales—The British Admiralty has notified the collieries warning them against shipping coal, and has furthermore sent out notification that all coal is liable to be taken by the Admiralty under emergency contract in which case inedmnity will be made for breach of private contract.

The executive council of the South Wales Miners Federation on Aug. 1, refused to acceed to the suggestion of the British Admiralty that the miners in the collieries supplying vessels of the navy should work on Aug. 4 and 5 which had been arranged as miners' holidays. The council took the ground that it was not necessary for defensive purposes for the miners to work, and declined to encourage British intervention in the European conflict.

PERSONALS

H. S. Wyly, formerly connected with the East Kentucky Coal Co., of Torchlight, Ky., has taken the position as traveler in Indiana with the Victoria Coal Co., of Columbus, Ohio.

Daniel F. Connor, general sales agent of the firm of Whitney & Kemmerer, has left New York for Marblehead, Mass., to join M. S. Kemmerer on his yacht the "Uinta" for a cruise on the coast of Maine.

Clarence M. Schwerin was elected president of the Vinton Colliery Co. at a meeting of the board of directors held at Vintondale, Penn., on Tuesday, July 28. Warren Delano was elected chairman of the executive committee at the same meeting.

W. C. Pollock, formerly foreman for the Sonman (Penn.) Shaft Coal Co., has been appointed superintendent of the Elkhorn Mining Corporation of Wayland, Ky., his place as foreman being taken by W. G. Strachan, who was formerly with the Elkhorn Mining Corporation.

Senator J. K. P. Hall, the well known bituminous operator has suffered a slight relapse. On July 29, he was able to walk about his room. Attending physicians are of the opinion he will recover, although his convalescing period will take several weeks. Senator Hall is in his 70th year.

John Berkheiser for many years inside superintendent for the upper division of the Scranton Coal Co., has partially severed his connections with that firm. Mr. Berkheiser will be succeeded by James W. Smith, of Peckville. He will, however, remain with the company in an advisory capacity.

John C. Neale has resigned his position as assistant general manager of sales and structural engineer of the Carnegie Steel Co., of Pittsburgh, Penn., to become president and general manager of the Central Steel Co., of Massillon, Ohio. John W. Dix has succeeded Mr. Neale with the Carnegie Steel Co.

OBITUARY

John P. Thomas, said to be the oldest miner in Missouri in point of service, died at Marceline on July 17. He was 75 years old, and had worked in coal mines in Wales, his native country, and the United States, since he was seven years old.

Thomas J. Pearce, of Portage, Penn., died July 30 at the Memorial Hospital, District No. 2, of the United Mine Workers of America. A native of England, Mr. Pearce came to Portage about 24 years ago, being a member of the firm of George Pearce & Sons Coal Mining Co., operating two mines, and employing 400 men. In addition to being General Manager of the above concern, he owned the Ivy Ridge Coal Co., was president of the River Mining & Manufacturing Co., of Virginia, and president of the Forest Hill Coal Mining Co., of Johnstown. His death followed an attack of appendicitis from which peritonitis developed, and which an operation failed to relieve.

CONSTRUCTION NEWS

South Bethlehem, Penn.—A new 500-ft. additional extension is being made to the coal storage plant of the Lehigh Coke Co. at this place.

Lexington, Ky.—The Commonwealth Coal & Timber Co., recently organized in Lexington, expects to begin within the next few weeks, some important development projects in Letcher and Perry Counties.

Bakerstown, Penn.—The Sterling Coal Co. and the Bakerstown Land & Improvement Co. anticipate the construction of a new machine shop, 10 new houses, and the installation of new electrical equipment some time early this fall.

Oscaloosa, Ky.—The Valley Creek Lumber Co., with headquarters at Rochester, N. Y., has purchased an additional 1000 acres of coal and timber properties. It will develop the timber tracts, and lease the coal for early development. The property lies near the Lexington & Eastern Railroad.

Hazard, Ky.—The Middle Fork Coal Co., of which C. G. Bowman is president, and which was recently organized, announces the early beginning of a large development of coal properties near Bullock, three miles above Hazard, on the Louisville & Nashville railroad. This firm will have an output of about 1800 tons daily.

Colver, Penn.—Contracts have been let for the erection of 40 new houses in Colver. A new two-story brick building which is to house the post office has also been ordered erected. The houses are to be of a superior style of construction. They will be of wood and will contain six rooms, with all modern improvements. The new Presbyterian Church is nearly completed and will soon be ready for dedication.

Earlington, Ky.—Work is proceeding rapidly on the Victoria Coal Co.'s development of its mine No. 9, several hundred yards north of the present workings. This shaft will be 300 ft. deep and with the air shaft will require several months to complete. Frank D. Rash, president of the company, and the other officers and stockholders at a recent meeting perfected plans for reorganization, but these plans have not been given out.

Finleyville, Penn.—Work at the new coal shaft at Coon Island is progressing steadily. The shaft is being cemented to a depth of 85 ft. As soon as this work is finished excavations will be resumed and the shaft sunk to a lower level when another stop will be made for concreting. Arrangements are being made for the erection of 40 four-roomed houses. A spur has been built from the Baltimore & Ohio railroad to the new works, which are located on the south side of the main line and in plain view of the travelers on the old National road.

NEW INCORPORATIONS

Knoxville, Tenn.—The Big Emory Coal Co., with an authorized capital of $50,000, has been incorporated here, the incorporators including C. W. Henderson, C. M. Thomas, W. S. Bobinson, A. H. Bowling and Harry R. Smith.

Huntington, W. Va.—Notice of the dissolution of the Island Creek Fuel Co., which was recently given by the attorneys of the United States Coal & Oil Co., has no significance particularly as the Island Creek Fuel Co. is an old holding firm and no operations have ever been carried on under this name.

Winding Gulf, W. Va.—The Stone Coal Co., has been organized with a capital of $25,000, all of which has been subscribed and $2500 paid in. This firm is privileged to buy lands in Raleigh County, build and operate railroads, electric, power and telephone lines, operate coal mines, etc. The incorporators are E. C. Minter, B. E. English, and H. A. Minter, of Winding Gulf, Jesse E. Oliver, and Joe L. Smith of Beckley, and G. A. Hinterleigner of Affinity.

Richwood, W. Va.—A charter has been issued to the Beaver Coal & Timber Co., with chief works located at Richwood. The object of the incorporation is the acquisition of coal, oil, gas, and timber lands, the development of the same, and the manufacture and sale of their products. The authorized capital stock is $100,000, of which amount $500 has been subscribd, and $100 paid in by the incorporators, who are G. H. Odell, J. W. Odell, E. D. Crawford, J. E. Crawford, and W. L. Ashby.

INDUSTRIAL NEWS

Columbus, Ohio.—The contract to supply 15,000 tons of coal to the Ohio State University has been awarded to the Victoria Coal Co. on a B.t.u. basis. The coal will be furnished from the Sedalia mine.

Tamaqua, Penn.—The Panther Creek valley washeries of the Lehigh Valley Coal & Navigation Co. have suspended operations indefinitely. This close down is attributed to the poor demand for washery coal.

Philadelphia, Penn.—The United Gas Improvement Co., of Philadelphia, is reported to be in the market for its annual supply of coke, amounting to approximately 250,000 tons. It is said also, that the Reading Coal & Iron Co., has contracted for about 20,000 tons of furnace coke.

Columbus, Ohio.—The announcement is made by the officials of the Chesapeake & Ohio R. R. Co. that the new line to be built to connect Portsmouth and Columbus will carry passengers as well as freight. The original announcement was that it would be a freight line exclusively.

Jefferson City, Mo.—The Western Coal & Mining Co. of St. Louis, owned and controlled by the Goulds of New York, recently secured the contract to furnish 25,000 tons of coal to the penitentiary for use the ensuing year, at $2.55 per ton delivered. The highest bid was $2.90 per ton for the same grade of coal.

Columbus, Ohio.—The Columbus Coal Exchange of Columbus, Ohio, has been organized by the local retailers for the purpose of fighting trade abuses. It is proposed to ask operators to refuse to sell to "snow birds" and consumers directly. Other trade abuses will also be taken up and the matter of establishing a credit bureau is being seriously discussed.

Columbus, Ohio.—A new phase of the application of the Ohio mine-run law has appeared. This is in reference to lands leased for coal which are always paid for on the basis of the coal mined. These leases are all on the screened coal basis. Since the new law provides that all coal must be weighed this eliminated the screened feature and thus a new basis of settlement must be devised.

New York City—The Terry Steam Turbine Co., with works at Hartford, Conn., announces the appointment of Fimdanque Bros. & Son, of New York and Panama, with main office at 15 Whitehall St., New York, as its representative for the Republic of Panama and the Canal Zone. The Cleveland office of the Turbine company in charge of L. G. Finlay, has been moved from 710 New England Bldg., to 503 Union Bldg., Cleveland, Ohio.

Connellsville, Penn.—W. H. Warner, president of the W. H. Warner Co., a large operating and selling corporation of Cleveland, Ohio, recently negotiated the purchase of 262 acres of coal in Washington County, about 6 miles from Charleroi, along the Monongahela River and within reach of the Monongahela Division of the Pennsylvania R. R. The price paid ranged from $900 to $1100 per acre, without the surface rights. This was for the Pittsburgh seam only, the Freeport vein being reserved by the sellers.

Springfield, Ill.—The State Civil Service Commission, of Illinois, will hold an examination at Springfield, on Sept. 5 next, to provide an eligible list of persons qualified to act in the position of assistants to the three mine rescue stations of the state located at La Salle, Springfield and Benton. This examination which will be entirely oral and thoroughly practical will be held in the mine rescue station in Springfield before a competent board of examiners. The salary limits are $75 to $100 per month, and the age limit is between 21 and 50 years. Several vacancies for these positions now exist.

Pittsburgh, Penn.—It is stated that a pronounced impetus has been imparted to the coal business of the Pittsburgh and West Virginia districts as a result of the impending European war. West Virginia companies took heavy contracts to supply coal to the Italian and Egyptian governments early in May, and orders have been received to hurry shipments in order that cargoes might be landed before serious hostilities had begun. Hurry orders were also received from across the Canadian border. While Nova Scotia produces coal in abundance, the distance to the cities and ports on the St. Lawrence River in the provinces of Ontario and Quebec is so great, that coal from West Virginia and Pennsylvania is shipped there. For purposes of coast defence in case of serious hostilities, it will be necessary to have a supply of coal at available points, consequently the hurry orders above mentioned.

Coal Trade Reviews

General Review

Anthracite operations heavily restricted. European wars disrupt routine business on the Atlantic Seaboard. Market technically strong but subject to many disturbing influences. Middle Western situation improving.

Heavily curtailed operations in the mining regions and large cuts in the circular by individual producers, continue the predominating features in the hard-coal trade. The temporary spurt at the close of last month, due to the regular advance in the price schedule, has disappeared and with the possible exception of some increase in Lake shipping, the business is flat and devoid of any interest. Fears are expressed in some quarters as to the possibility of a labor shortage as a result of the European war. While it is true that the rank and file of our mining population is largely foreign born, conservative observers do not believe the migration will attain sufficient proportion to prove a serious menace to the coal industry.

The Atlantic seaboard bituminous trade is rather more unsettled as a result of the European controversy. The almost complete cessation of exports in lines dependent upon the coal industry, as well as in the industry itself, have so disturbed routine business that producers are showing a disposition to hold off pending further developments. Poor collections and more stringent regulations of credit as a result of the worldwide liquidation of securities of all sorts, is another important factor in the situation. As a rule very little business is being negotiated. Operators are rigidly curtailing production down to immediate requirements, while the circulars are firmly maintained as a rule. Some few tonnages have accumulated at New York as a result of the cancellations of shipping, but these are by no means excessive. The trade is in a technically strong position and will respond rapidly to any expansion in general business.

Pittsburgh district prices continue irregular on both spot and contract business, while Lake shipments are still unsatisfactory and the line trade only slightly better; definite indications of increased activity and improved sentiment in the iron and steel industries are the best features of the current situation. As a rule no important developments are anticipated before the fall trade opens up, although isolated buying from unexpected quarters is regarded as significant of the trend of conditions. With some of the Ohio mines now under operation and others resuming as rapidly as possible, a more optimistic feeling prevails in the trade there. Steam consumers, now dependent upon West Virginia mines are showing a disposition to swing back to the Ohio product and contracts are being negotiated on a profitable basis.

The southern situation has not experienced any change with the possible exception of some increased inquiries for lump coal, and a slight stiffening in the steam prices. A substantial improvement is noted in the Middle Western domestic grades, while the steam fuels are weak with every indication of continuing so, unless there is a sharp increase in the industrial consumption. The Ohio coals are still out of the market while there is considerable buying for storage purposes and the beneficial effects of the large crop will soon be in evidence.

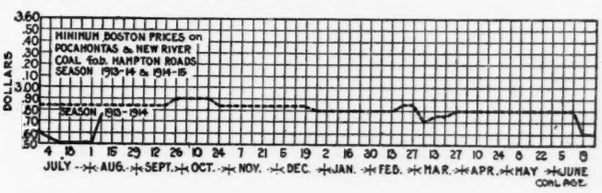
ATLANTIC SEABOARD

BOSTON

Pocahontas and New River shippers marking time but the outlook is favorable. Market coal eliminated. Pennsylvania grades steady as to price with some gain in tonnage. Georges Creek in excellent position with prices still firm. War scare causes some speculation as to effect on mineworkers.

Bituminous—Pocahontas and New River are very dull. That the shippers are marking time, however, instead of forcing shipments on a demoralized market is a great improvement, because of the extremely quiet situation. A rigid curtailment is in effect in most of the West Virginia districts and this week the last of the market cargoes was disposed of. Schooners, barges, and steamers are all in plentiful supply and rates from Hampton Roads are as low as at any time in three or four years. F.o.b. sales, so far as reported are strictly on the $2.85 basis; on many sides there seems a disposition to go easy until the market tones up. That September will develop a wholesome situation for the Southern coals is now freely predicted.

Although the Pennsylvania grades have not yet shown any increase in price there are many signs of buying power. Contractors are showing interest again and while the gain is very slight there is no doubt the market is already on the mend. The quality grades are naturally the first to feel the benefit but a comprehensive improvement is counted on with the approach of September. Those buyers who cannot credit a permanent settlement of Hampton Roads price difficulties are calling for moderate supplies of Cambria coals, for instance, and this has a steadying effect on all the grades moving into Philadelphia and New York.



The Georges Creek shippers are well supplied with orders for several weeks and the price list is as strong as ever. The movement of the fleet in July was up to the maximum and there is now no uneasiness over the outlook. The demand for all-rail is also improving.

Anthracite—The trade is almost featureless. The mines were under suspension several days in July and consequently there has been some delay in loading cargoes at New York, particularly when requisitions called for a proportion of stove. A few dealers are taking seriously the alarmist reports that Pennsylvania will be emptied of skilled miners by reason of summons to help their native countries in the war. This is not a feeling that is at all general, however, and in all probability there will be nothing to start anthracite moving in better volume until stocks have been worked into by the consumer more than they have thus far. Dock screenings are still in good demand.

Bituminous prices at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.90@1.45	$1.20@1.65	$1.67@1.77	
Philadelphia*.....	2.15@2.70	2.45@2.90	2.92@3.02	
New York*.....	2.45@3.00	2.70@3.20	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.75@2.85
Boston†.....	.....	.....	.....	3.58@3.65
Providence†.....	.....	.....	.....	3.68@3.78

* F.o.b. †On cars.

NEW YORK

European wars and uncertainties in the financial situation causing a contraction in the bituminous trade. Considerable inquiry from foreign governments. Anthracite quiet and further restrictive measures put into effect.

Bituminous—The already flat situation prevailing in the New York soft-coal market for the past few months, has been further accentuated by the European wars. At the present moment the severest strain is felt in the monetary situation. The heavy liquidation of securities of all classes has created such a tense situation in financial circles that banking interests are placing severe restrictions on loans with the result that collections are bad, and sellers are disposed to require unusual protection. Marine business is at more or less of a complete standstill pending a re-adjustment to the new conditions.

Particular interest is felt in the bunkering and export trades. With the Berwind White Co. refusing any information on this subject beyond issuing a statement that "conditions are normal" there is little data to be had. Outside rumors are current to the effect that the Berwind Co.'s storage facilities at tidewater were congested with about 40,000 tons of coal early in the week. Considrable inquiry is reported generally from foreign governments. Local companies are inclined to scrutinize credits on such business carefully.

Shipments to tidewater have been vigorously curtailed of late, so that the market was in a strong position in this respect, but the disruption in export business will no doubt result in accumulation of demurrage coal, for the time being. A temporary slowing down in the industries dependent upon export trade will be inevitable, but it is generally felt that they must shortly feel the increased call from foreign countries for American commodities.

The market is not quotably changed from the past few weeks which we continue as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The exports of hard coal being practically nil, the market has experienced no change with the possible exception of a contraction in credits. The companies are still stocking chestnut while the individuals are offering substantial concessions in order to move it. The first of the month activity helped egg and stove coal, particularly the latter, but the market has again relapsed back into the former dullness. Some line demand for egg and stove is noted, but there is no call for nut in any direction. With firmer water rates prevailing to down east points, and purchasers well supplied for the time being, there is a tendency to stop buying pending a break in the water freights.

On the steam grades few concessions are offered on high grade pea coal, but the off qualities are available at substantial cuts. The Nos. 1, 2 and 3 high grades of buckwheat are in short supply due to restricted operations at the colliers where these are produced; the lower grades are offering in large tonnages, at from 25 to 50c. off the prevailing circular.

In view of the tight situation in monetary circles, the coal men are becoming exceedingly careful about who they sell and are showing a disposition to require satisfactory guarantees as to payments. Reports were current early in the week that further restrictions would be put into effect.

The market is now quotable as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	$4.60@5.00	$4.95	$4.55@4.95
Egg	5.25	4.90@5.25	5.20	4.85@5.20
Stove	5.25	5.15@5.25	5.20	5.00@5.20
Chestnut	5.50	4.95@5.50	5.45	4.75@5.45
Pea	3.55	3.40@3.55	3.50	3.25@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	1.90@2 75
Rice	2.30	2.15@2.30	2.00@2.25	1.50@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

BALTIMORE

Bituminous and anthracite are both extremely flat with little prospect of any immediate change. Much speculation as to effect of European war on the export trade.

A feeling of inertia hangs over the coal trade. Outside of that moving on contracts, the past week saw little or nothing doing. New business is so infrequent as to be negligible. Railroad movement from mines to tide is considerably better, but it is now a question of getting buyers at terminal points. More of a surplus was noted about the piers and terminals the past week than for a long time past.

Depressed conditions are partly due to the uncertainty of the export coal trade; some of this coal was released on the market due to refusals to charter. Occasional foreign charters are being made, but there was a notable lack of any movement to the French points that have recently been taking American coal. What the effect of the complete withdrawal of Welsh coal will have on the marketing of the product of this country, is one of the uncertainties of the hour as created by the general war scare in Europe.

Prices of fuels for domestic use have undergone little or no change, and it is hard to set a price when so little trading is going on. In West Virginia three-quarter gas was offering at from 80 to 90c., run-of-mine at 70c., and slack at varying prices from 55c. upward. Pennsylvania line coals in some cases sold as low as 95c. to $1, with better grades at from $1.15 to 1.35, with very little selling of the best fuels.

Export figures for July as announced by the Custom House showed a total shipment from the Baltimore piers of 87,265 tons.

PHILADELPHIA

No improvement noted in the anthracite trade. The heavy curtailment an index of existing conditions. No immediate change looked for. Bituminous still flat, with very little spot demand, and prices on a parity with last week.

Anthracite—There has been no apparent change in the anthracite situation. Curtailment at the mines still continues with the output at about 50% capacity. At the present time, there seems to be a slightly better call for egg size. Broken is well taken up on contracts, and with curtailed production, the junior sizes, with the possible exception of pea, are moving off. Outside of chestnut and pea, the market is absorbing practically the entire output under restricted mining, and continued efforts are being made to increase the market on these sizes. While it is not felt that the European war troubles will effect the labor situation to any appreciable extent, at the same time speculation is rife as to what this will ultimately result in. Many of the foreigners in the anthracite regions still owe allegiance to foreign countries, although little fear is expressed that the exodus will have any appreciable difference on the production of either anthracite or bituminous coals.

Bituminous—Trade is still flat in the bituminous industry. Spot coal is seeking a market, and prices realized are far from satisfactory. Operators generally believe that both demand and prices will improve within the next month or six weeks. Considerable accumulation of coal is reported at tidewater, but this is all likely to be disposed of as soon as vessels or barges can be secured. Refusal to entertain propositions to contract at the current prices is still the position taken by the operators ,who apparently are strong in their contention that the fall will see an improved demand. Purchasing agents are shopping around, and are able to secure their requirements, at considerably less than contract quotations.

CHARTERS

Coal Charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tonnage	Rate
Queenswood [2]	British	Cardiff	Bermuda	1694	$1.68
Iona Tunnel [1]	.....	Philadelphia	Cay Francis	1118	1.90
James W. Ewell [2]	.....	Philadelphia	Porto Rico	1081	1.60
Florence Creadick [1]	.....	Philadelphia	Jacksonville	657	.....
Hope Sherwood [1]	.....	.....	Mayport	522	.....
Pendleton Sisters [1]	.....	Philadelphia	Calais	899	1.10
Eagle Wing [1]	.....	Philadelphia	Boston	1076	0.60

[1] Schooner [2] Steamer

HAMPTON ROADS

Movement of coal from Hampton Roads still light. Dumpings for month of July 929,956 tons. Accumulations at tidewater continue above normal. Some price cutting.

The dumpings for the week have been light although some large cargoes have moved to Boston and other New England ports. Export shipments have been few, the Italian market taking the largest percentage of the business. Shipments foreign have been to Genoa, Venice, and Para with one cargo to Luderitz Bay, South West Africa. This latter cargo was taken by the sailing ship "Timandra" while the other foreign shipments went by steamers.

Coal accumulation at Hampton Roads railway yards is still above normal and while vessel tonnage about due will considerably reduce stock on hand shipments coming forward will still keep the supply above normal. Demand on all grades is light and little spot coal is being sold.

Regular circular prices are still being quoted although it is believed some of the smaller suppliers are making some cut in order to move some tonnage in the railway yards.

Dumpings for July, while falling somewhat behind those of July, 1913, are considerably heavier than was expected. The total dumpings for the month were: Norfolk & Western Ry. at Lamberts Point 448,295 tons, Chesapeake & Ohio Ry. from Newport News 264,870 tons and the Virginian Ry. at Sewalls Point 216,791 tons. Both the Virginian Ry. and the Norfolk & Western have fallen below their figures for July, 1913, while the Chesapeake & Ohio Ry. shows a fair increase.

LAKE MARKETS

PITTSBURGH

Rumored negotiations for 1915 supplies for byproduct coking plants. Demand slightly improved. Prices still very irregular.

It is reported that there are some tentative negotiations looking to 1915 coal contracts for byproduct coke ovens, but it is not likely any business will be closed in the very near future. Lake shipments continue unsatisfactory, though there are hopes of improvement by the middle of this month. Line trade has improved slightly, partly by further exhaustion of stocks and partly by increased manufacturing activity. The iron and steel industry has operated as well in July as in June, which is unusual, and expects materially heavier operations in August, with an increase of perhaps 10% over July and a similar increase in coal consumption.

Prices continue very irregular, not only for free coal but also for contract coal. Slack, however, continues to show

the firmer tone noted a week ago, and is quotable at 60@65c. for prompt lots. Regular circular prices, which are entirely nominal at this time, remain: Slack, 80@90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

BUFFALO

Bituminous a trifle better at occasional points. No higher prices anticipated yet and may not come till winter. Anthracite helped by end of the month rushes but otherwise unchanged.

Bituminous—Here and there a well-received jobber finds that a few good orders are coming, but the rule is that they are difficult to find. This is encouraging, however, as changes for the better have to begin in that way. It will probably be cold weather before the demand is really good. Even then the mines have so much more capacity than is used now that it would be easy for a long time to keep ahead of any improvement in the demand, no matter how fast it appears.

There is every effort to keep the coal trade in hand as much as possible. Some of the mine owners occasionally ship a few cars into territory where some good salesman is well known and then invite him to sell them. There is hardly the former amount of coal selling at low prices, which is a move in the right direction, though the people who sell unbought coal for their friends do not pretend to get as much for it as they do for their own. Quotations remain on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley sizes are about 25c. less. Slack is doing better. The large amount of it from points beyond Pittsburgh is often what makes the mischief, especially as it is not very high grade.

Anthracite—There has been a better long-distance trade in anthracite to finish the month, as is usually the case. A good salesman can dispose of a cargo in the Lake district at such time, to save the 10c. a ton, when he could not sell it at all, early in the month. The movement of anthracite by Lake is heavy, being 178,000 tons for the week and 810,410 tons for July, which is 30,000 tons more than in July last season. The shipment for the season is 2,219,735 tons, as against 2,566,606 tons to date last season. There is very little local demand for coal.

TORONTO

Market dullest for a long time. Acute situation developed by the war scare fails to create any buying.

Trade continues quiet, the demand for steam coal being smaller than it has been for some years. Notwithstanding the general anticipation of a speedy rise in price owing to the war, few are buying ahead of immediate necessities. Prices remain as follows with occasional shadings in car lots by jobbers in bituminous: Retail—anthracite, egg, stove and nut, $7.50; grate, $7.25; pea, $6.25. Bituminous, steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50; wholesale, f. o. b. cars three-quarter lump, $3.68, screenings, $2.64.

TOLEDO

Situation unchanged but an excellent undertone prevails. Industrial conditions improving rapidly. Labor situation clearing up.

Toledo has shown little change, save for the usual raise in prices Aug. 1. Business is coming in about the same and the Lake shipping has shown no particular betterment. But despite all this, dealers are predicting improvement as soon as the weather is a little cooler. Notwithstanding the fact that all orders have to be dug up by persistent work, business generally is on the up grade.

The influence of the heavy crops is already noticeable. The railroads have begun placing orders for new rails and equipment, and placing idle shops in operation getting ready for the heavy traffic due within a few weeks. Industrial concerns are increasing operations and there is a general quickening of business. During the past week the increase in operations at the steel plants has amounted to 5 per cent. as compared with the previous week's average.

COLUMBUS

Mining is being resumed in the Hocking, Pomeroy, Jackson and Cambridge fields. Sales agents report a good demand for both steam and domestic sizes. Lake trade will also be active.

With the working agreement in most of the Ohio districts adjusted, mining will be resumed in many places early in the month; in fact quite a few mines opened Aug. 3 and others are being put into operation as rapidly as possible. The situation is correspondingly better and coal men expect a fairly busy season from this time on.

Steam demand is gradually increasing and salesmen have been started out for orders. While many of the steam users have been depending on West Virginia coal, they are expected to switch back to Ohio product as soon as mining is resumed. A few contracts for steam grades have been made and others will be closed within the next few weeks.

In the domestic trade there is some activity developing also. Dealers' surpluses are quite small and since they are moving larger quantities they have been compelled to replenish stocks. There is a marked preference in this market for the fancy grades such as Pocahontas and re-screened varieties but Hocking Valley is also still in demand. Retail prices advanced on the average of 25c., Aug. 1.

Lake trade is expected to take on more activity with the resumption of mining. Chartering of boats is going on rapidly and it is expected that Ohio will furnish quite a tonnage to the head of the lakes before the close of navigation. Dock prices are the same as last year. Reports from the Northwest show that the docks are not at all congested. Th Toledo docks of the Hocking Valley Railway Co. have handled 1,193,000 tons since the opening of navigation.

Prices in the Ohio fields:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Rescreened lump	$1.60		$1.65	$1.50
1½ inch	1.50		1.50	1.50
¾-inch	1.30	$1.20	1.35	1.30
Nut	1.25		1.35	1.15
Mine-run	1.15	1.05	1.15	1.10
Nut, pea and slack	0.70		0.75	0.65
Coarse slack	0.60	0.60	0.65	0.55

CINCINNATI

Temporary activity in the steam market preceded the circular advance of August, and a slightly improved domestic demand is felt. Lake traffic is comparatively slow, with plenty of boats available. Outlook regarded as very favorable.

The fact that prices for August delivery were scheduled for an increase, resulted in an improved demand during the last week of July, a number of contracts being closed and the movement of spot coal, better than for some time. But in all essentials the situation here remains unchanged, the slight improvement in the industrial field having as yet brought no marked increase in the consumption, while in the domestic market the same state of indifference on the part of the dealers and public alike exists as heretofore When this disappears later on, as it certainly will, there will be difficulty in supplying the demand, but so far this consideration has had little, if any, effect on the trade.

CLEVELAND

An improvement in retail and out-of-town demand noted. Heavy shipments of slack have created a light demand in Cleveland proper. The Lake trade is again showing signs of improvement.

Following heavy receipts of slack, amounting to as much as 100 cars a day, there is very little demand for fine coal. Receipts over Sunday were not as large as the average for last week and though the market is slightly lower it is not so weak as would be expected under the circumstances.

Out-of-town trade is inquiring for coal and orders for all grades are being taken for shipment, as soon as Ohio mines are at work. Hocking and Cambridge districts are shipping Lake coal and some of these grades are being sold in the all-rail markets.

The retail trade is taking more Pocahontas and anthracite. Owing to the small demand for slack, prepared sizes are held firm and in some cases lump and egg are quoted as high as $2.35 to 2.50 at the mines. Only a limited number of companies are taking orders at the circular. Those who are quoting higher prices claim to be well sold up. Operators are offering 1¼-in. Youghiogheny at $1.50 at the mines, but it is understood sales at $1.35 to 1.40 are being made.

The Lake trade is showing some signs of improvement. With all districts at work except No. 8, other coals are beginning to show greater tonnage. Docks are sending a little more fuel forward and, as Upper Lake docks are relieved, shipments from lower ports are increased. The incease is not particularly noticable as yet, but shippers expect it to be considerably improved by the end of the month.

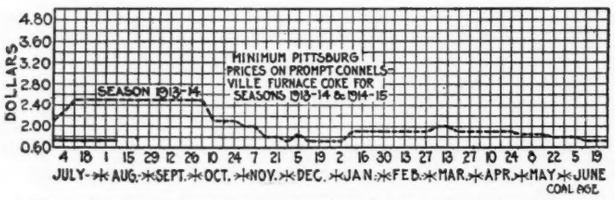
Quotations are as follows:

	Pocahontas	Youghiogheny	Fairmount	W.Va. No. 8
Lump	$3.60			
Lump, 1½ in.		$2 50		
Lump, ¾ in.		2.20@ 2.25	$2.05	$2.05@ 2.10
Egg	3.60			
Mine-run	2.60	2.15	1.95	2.00
Nut		2.20		
Slack	2.20@ 2.35	1.65	1.70	1.60@ 1.65

COKE

CONNELLSVILLE

The month-end brought no demand for furnace coke, and it is evident that all consumers are covered for July and August at least. At the beginning of July there was $1.75 coke available for the two months, if not for three. Prior to that time a number of contracts for second-half had been made. About the middle of May there were three or four contracts at $1.85 and 1.10, while about the middle of June three contracts were closed for coke at $2, this, however, being for an exceptionally desirable brand. There are rumors that considerable prompt coke could be had at less than $1.75. We quote: Prompt furnace, $1.75; contract furnace, $1.75@2; prompt foundry, $2.25@.35; contract foundry, $2.35@2.50, per ton at ovens.


DOLLARS
4.80
3.60
3.20
2.80
2.40
2.00
0.60
MINIMUM PITTSBURG PRICES ON PROMPT CONNELSVILLE FURNACE COKE FOR SEASONS 1913-14 & 1914-15
SEASON 1913-14
4 18 1 15 29 12 26 10 24 7 21 5 19 2 16 30 13 27 13 27 10 24 8 22 5 19
JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE
COAL AGE

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended July 25 at 268,290 tons, an increase of 90 tons, and shipments at 267,361 tons, an increase of 8599 tons. Production appears to have exceeded shipments in the week by 929 tons, while the accumulated excess in 18 weeks appears to have been 53,032 tons.

BUFFALO

There is no stir reported anywhere, and not much encouragement to sell. The demand is not improved and dealers seem quite discouraged. One reports that he has as much difficulty in selling a car of coke as he did in half a dozen cars of coal. It seemed as if the less a consumer bought the more time he had to complain of it. Quotations remain on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.25 for stock coke.

DETROIT

There are signs of an improved demand for coke on this market. Connellsville has been as low as $1.90 but is gradually advancing and is now being quoted at $2.15 for prompt delivery. Semet Solvay is quoted today at $3.25 and gas house at $2.75. There is little or no demand for the latter.

CHICAGO

Furnace and foundry coke have not advanced as rapidly as was expected as the betterment in the iron and steel trades has not been as marked as was anticipated. Connellsville and Wise County are quoted at $5; byproduct, egg, stove and nut, $4.75; gas house, $4.25.

ST. LOUIS

There is no coke moving in but there is a good demand for the local product. Gas house is quoted at $4 f.o.b. St. Louis and retails at $5.75.

BIRMINGHAM

This week has brought no change in either the furnace or foundry coke market. There is some foundry coke moving at satisfactory prices, but the tonnage is not large, consumers buying only for their immediate requirements. There is nothing doing on furnace coke.

SOUTHERN

BIRMINGHAM

Lump coals show a slight improvement but steam grades are unchanged from last week.

This week has brought about a slight change for the better in the lump coal market. Prices have remained about the same but inquiries are more numerous and for larger tonnages although the movement has not increased yet. The steam-coal market shows very little change; the demand is far below normal, and prices, in many instances, have declined below the usual base. It is stated that many of the larger railroad contracts are being closed at a lower price than last year. The prospects for a better demand and prices are very good, and business should be greatly improved within the next 30 days.

LOUISVILLE

Considerable stocking for the winter and the trade is notably stiffer. Steam grades also in better demand.

A stiffening all along the line is reported by operators and dealers at the beginning of August, with prices, averaging ten cents higher on practically all grades. Extensive rains helped the demand from the interior points, where the farmers are putting in their winter supplies of fuel and the requirements from other points have increased.

Steam coals have come into better demand from both the North and the South, especially with the Eastern Kentucky fields. There has also been some improvement in the Western field, though the winter requirements do not begin to help this section so soon.

Prices range around 75 and 80c. for the better grades of nut and slack; 90 to 95 for four-inch run of mine; $1 to $1.05 for run-of-mine; $1.65 to $1.75 for block, all prices f.o.b. mines.

MIDDLE WESTERN

INDIANAPOLIS

Operators expect an improvement by the middle of the month. The crop movement will then be under way and railroads will be larger buyers. Domestic grades will also be moving. Mines are on about half-time.

No improvement is noted yet but operators believe a change is due shortly. By the middle of August the movement of the wheat and oats crops will be felt and domestic grades will begin to move to retailers' yards for storage purposes.

Operators also expect an improved demand this month as a result of the low prices. These are still at the summer level and retailers will doubtless take advantage of them. The demand for steam grades is about unchanged. Mine-run is selling at $1.05 to 1.10 and screenings at 85 to 90c. The mines are on not better than half-time generally and low prices are made to keep them in operation. This is tempting some buyers who would not otherwise be in the market.

CHICAGO

Customary advances being made in the circulars. Considerable buying for storage purposes. Ohio coals still out of the local market.

Following the usual custom at this time of the year the companies are beginning to advance prices and quotations are now on the same level as those of last year.

Smokeless and Hocking—There has been a marked improvement in the smokeless situation due principally to heavy storage buying for apartment houses. Retail dealers do not care to draw on their storage piles yet and are taking care of this demand by placing orders with the mines. The supply of smokeless lump and egg is still less than the demand and the price is firm. Although a few Hocking mines are now in operation, none of this coal is being received in Chicago the current production being moved to markets near the mines and to the Lakes.

Illinois and Indiana—Carterville operators are asking $1.35 for lump and egg for the first half of the current month. No. 1 washed coal is being held at $1.40 to 1.50, the bulk of the business moving at the lower figure. Both groups of Franklin County operators have advanced prices. The smaller companies now have a circular price on lump, egg and No. 1 nut of $1.50 which will be in force until Aug. 15. Several of the larger companies have issued a circular of $1.60 for the first half of August and one concern quotes $1.65.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.07	$2.55@2.70	$2.12	
Steam lump	1.87@1.92		1.97	
Egg		2.55@2.70		$4.05
Mine run	1.87	2.15@2.25	1.87	3.30
Screenings	1.57@1.62	2.55@2.70	1.57@1.62	

Harrisburg quotations are: Domestic lump and egg, $2.40; steam lump, $2.25; mine-run, $2.15@2.25; screenings, $1.80@1.90; No. 1 nut, $2.55; No. 2 nut, $2.40.

Carterville prices are: Lump and egg, $2.40; No. 1 washed, $2.45@2.65; No. 2, washed, $2.35@2.40.

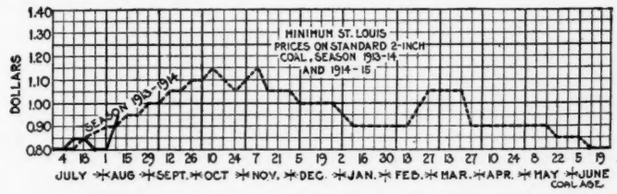
ST. LOUIS

Prices advancing and a stronger demand in all quarters especially for domestic grades. Steam coals the only exception. Possibilities of an acute situation already in sight this fall.

The month of July closed with prices advancing on all the high grade coals, especially domestic fuels, and a growing demand from all quarters. The steam market is a trifle weak

with prices gradually dropping; indications are that by the latter part of September prices on steam coal will be lower this year than they have in many years past, unless there is sharp picking up in the industrial lines. Prices on the high grade domestic coals advanced on the first of August from 10 to 20c. a ton, and these prices are only good for the first ten or fifteen days in the month, and subject to change without notice.

The washed market is a little weak, and washed coals have been lower than for many years at this particular time, although there are indications that the Nos. 1 and 2 washed sizes will move freely about the tenth of the month, when the cotton gins begin their buying in the South.



Standard 2-in. lump is gradually going up on account of the slump in the screenings market, and the first of the month saw this grade quoted at from 95c. to $1, with a good chance of going better. Screenings, on the other hand, were down to 60c., and liable to go to 50c. without more than 24 hr. notice. Even at this, the operators in the Standard field are still selling coal far below the cost of production, and it begins to look as if this would continue throughout the season.

The present circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.30	$0.95@1.00	$1.00
3-in. lump	.....	....	.....	.....	.....
6-in. lump	$1.25@ 1.40	....	1.40	1.00@1.10	1.25
Lump and egg	1.85@ 2.15	$2.15	.....	....	1.15
No. 1 nut	1.20@ 1.35	....	.....	....	.....
Screenings	0.70@ 0.75	....	0.80@0.85	0.65@0.70	1.60
Mine-run	1.00@ 1.15	....	.....	0.75@0.80	.....
No. 1 washed nut	1.35@ 1.40	2.25	1.50	....	.....
No. 2 washed nut	1.20@ 1.25	....	1.35	....	.....
No. 3 washed nut	1.15@ 1.20	....	.....	....	.....
No. 4 washed nut	1.10@ 1.15	....	.....	....	.....
No. 5 washed nut	0.60@ 0.70	....	.....	....	.....

Smokeless lump and egg is $4.90. The retail price is $6. Arkansas Spadra, f. o. b. cars St. Louis, for egg, grate, and nut is $5.80. The retail price $7.

KANSAS CITY

Operations on practically a fulltime basis and the outlook favorable. Stocks reported light.

Mines in Kansas and Missouri are working nearly to capacity. Demand is the best since last winter and operators are finding no difficulty in moving practically their entire output. Dealers' stock are light, as the result of their disinclination to buy, except on a hand-to-mouth basis, last spring. They cleaned out their yards in good shape at that time, and are now loading up for expected fall demand. With record breaking crops, operators believe that the season of 1914-15 will be one of the best in the history of the Southwestern trade.

PRODUCTION AND TRANSPORTATION STATISTICS

VIRGINIAN RAILWAY CO.

Shipments over this road for June, with details of leading operators were as follows in short tons:

Shipper	Tons
Knw., Glen Jean & E. R.R.	32,920
E. E. White[1]	26,073
Gulf Smokeless	21,869
Loup Creek Colliery	20,717
Slab Fork	19,811
New River Collieries	19,244
Pemberton Coal & Coke	17,253
E. E. White[2]	16,253
MacAlpin	14,324
Winding Gulf Colliery	13,278
Long Branch	12,454
Bailey Wood	11,707
The New River	9,743

[1]From Glen White. [2]From Stotesbury.

Gross shipments totaled 321,181 tons as compared with 304,030 for June, 1913, and 359,879 tons for May of the current year.

I. C. C. No. 5567—Beatrice (Nebraska) Commercial Club vs. Chicago, Burlington & Quincy R.R. Fourth section applications Nos. 1791, 1681, 1872, 1951, 2522, 4218, 4219 and 4784.

Rates on coal from Milwaukee, Wis.; Chicago and East St. Louis, Ill.; the coal fields of southern Illinois; southern Iowa; northern Missouri; the Kansas-Missouri districts and the Spadra, Ark., district, to Beatrice, Neb., not found to be unduly prejudicial as compared with lower rates to Lincoln, Neb., to which point Beatrice is intermediate. Complaint dismissed and carriers relieved from operation of the long-and-short-haul rule.

NORFOLK & WESTERN RY.

Destination of shipments over this road for June and the first six months of this year and last year were as follows in short tons:

	June		Six Months	
Coal	1913	1914	1913	1914
Tidewater, foreign	175,414	160,300	876,320	922,045
Tidewater, coastwise	.....	.....	22,841	15
Domestic	262,574	310,125	1,903,318	1,962,226
Coke				
Tidewater, foreign	1,623,923	1,845,531	8,651,814	9,632,950
Domestic	123,941	87,921	817,801	580,655
Total	2,185,852	2,403,877	12,272,094	13,096,989

Distribution of shipments for May and June compare as follows:

	May			June		
	Shipped	Tipple	Total	Shipped	Tipple	Total
Pocahontas	1,123,694	16,249	1,139,943	1,136,568	14,804	1,151,372
Tug River	260,887	2,268	263,155	242,208	2,134	244,342
Thacker	270,356	9,792	280,148	214,595	9,968	224,563
Kenova	92,958	8,810	101,768	88,455	8,897	97,352
Total	1,747,895	37,119	1,785,014	1,681,826	35,803	1,717,629

Shipments of coke, entirely from the Pocahontas field, amounted to 59,370 tons in June as compared with 60,949 tons in May.

FOREIGN MARKETS

GREAT BRITAIN

July 24—Spot coal continues to be weak. August coal, however, is very firm, in view of the Holidays and consequent further restriction of output. The Greek Government are reported to have bought a block of best coal, August shipment, at enhanced prices.

Approximate quotations:

Best Welsh steam	$5.04@5.28	Best Mountainshires	$4.08
Best seconds	4.56@4.80	Seconds	3.84@3.96
Seconds	4.20@4.32	Best Cardiff small	2.58
Best dry coals	4.20@4.32	Seconds	2.46

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those of Monmouthshire descriptions are net f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

Coke is quoted at: Special foundry, $6.36@6.72; good foundry, $5.28@5.76; furnace, $4.56@4.80.

British Exports—The following is a comparative statement of British exports for June and the six months of the last three years, in long tons:

	June			6 Months		
	1912	1913	1914	1912	1913	1914
Anthracite	189,973	218,814	205,686	974,193	1,407,097	1,360,242
Steam	3,928,199	4,397,791	4,112,167	18,720,167	26,034,245	25,094,812
Gas	1,161,590	986,510	993,284	4,487,837	5,510,408	5,739,845
Household	154,856	144,792	139,430	640,455	855,375	742,440
Other sorts	322,026	258,503	283,753	1,350,671	1,719,110	1,649,599
Total	5,756,644	6,006,410	5,734,220	26,173,323	35,526,235	34,586,938
Coke	51,139	75,336	74,163	388,108	499,670	517,609
Briquettes	108,649	185,162	192,034	635,283	1,022,232	1,044,360
Grand total	5,916,432	6,266,908	5,999,417	27,196,714	37,048,137	36,148,907
Bunker coal	1,561,215	1,721,016	1,681,477	8,125,897	10,087,037	10,182,157

SPANISH IMPORTS

Spanish imports for the first four months of this year and last were as follows in metric tons:

	1913	1914
Coal	949,199	939,728
Coke	125,304	126,501

GERMANY

Production, imports and exports of German Empire for the first five month of this year, as compared with last year, were:

	Production		Imports		Exports	
	1913	1914	1913	1914	1913	1914
Coal	77,648	79,132	4,071	3,830	3,691	14,909
Coke	13,333	13,310	235	229	2,837	2,171
Lignite	35,041	34,192	2,911	2,686	26	27
Coal briquettes	2,389	2,663	9	13	1,024	1,007
Lignite briquettes	8,576	9,415	52	57	375	355

Financial Department

Central Coal & Coke Co.

This company reports for the year ending Jan. 1, 1914, as follows:

RESULTS FOR CALENDAR YEARS.

Department	1914 Gross	1914 Net	1913 Gross	1913 Net
Wholesale coal	$930,740	$490,742	$920,289	$448,801
Retail coal	126,999	16,570	124,889	34,887
Wichita coal	40,251	3,862	50,873	8,008
St. Joseph coal	20,172	7,693	18,773	6,710
Salt Lake City coal	.....	.....	13,243	3,049
Washer	43,116	3,552	49,003	18,445
Mining	.....	.....	137,947	*33,808
Mining stores	.....	139,872	.....	132,903
Rentals coal department	.....	31,494	.....	.....
Wholesale lumber	743,229	305,804	788,204	363,496
Carson mill	829,051	169,276	661,410	93,856
Keith mill	529,478	96,503	574,212	113,582
Miscellaneous	.....	22,554	.....	41,812
Total	.....	$1,287,922	.....	$1,231,472

*Loss

INCOME ACCOUNT.

	Year ending Jan. 1. 1914	1913	18 mos. end. Jan. 1, 1912	Year end. J'ne 1, 1910
Net earnings as above	$1,287,922	$1,231,472	$1,395,304	$1,103,781
Deductions—				
Royalty cred. coal lands.	$126,664	$107,655	$125,665	$79,141
Royalty cred. timber lds.	339,865	253,679	278,619	241,805
Depreciation mill prop.	33,987	36,240	39,803	34,586
Deprec'n washer prop.	4,008	4,008	6,346	4,008
Deprec'n Kansas City motor trucks	4,544	.....	.....	.....
General expense	88,819	81,493	137,474	81,907
Interest on bonds	72,990	78,597	193,146	130,610
Interest and exchange	73,041	38,292	119,664	29,500
Total	$743,918	$599,963	$900,717	$610,557
Surplus earnings	$544,004	$631,509	$494,587	$502,224
Divs. on pref. stock	(5)93,750	(5)93,750	(7½)140,625	(5)93,750
Divs. on com. stock	(5)307,500	(6)307,500	(9)461,250	(6)307,500
Balance after divs.	sur$142,854	sur$230,259	def$107,288	sur$100,974

BALANCE SHEET YEARS ENDING JAN. 1.

Assets—	1914	1913	Liabilities	1914	1913
Coal lands	4,324,853	4,350,876	Common stock	5,125,000	5,125,000
Timber lands	3,536,350	3,459,554	Preferred stock	1,875,000	1,875,000
Coal shfts & bldgs	2,145,579	1,878,920	Undivided profits	1,624,264	1,574,848
Sawmills & impts	492,717	347, 241	Bonds	2,059,000	2,284,000
Yards & equip't.	99,227	99,373	Audited bills	657,262	542,954
Personal property	89,290	96,472	Bond int. not due	.....	26,381
Mo. & La. R. R. Co. stock	150,000	150,000	Sundry accounts	88,124	108,718
Bonds, etc., in other companies	160,102	150,101	Pay-roll balances	125,465	131,423
Acts for collect'n	1,788,463	1,544,311	Freight charges unadjusted	82,590	94,537
Inventories	684,701	603,254	Sink. fund for ins.	189,250	3,906
Cash	328,590	230,290	Bills payable	1,389,000	1,247,500
Sinking fund	50,000	50,000	Proceeds of sale of Delta Land & Timber bonds	647,832	.....
Sundry balances	13,915	43,875			
Total	13,853,787	13,014,267	Total	13,853,787	13,014,267

Note—For last previous annual report of this company see "Coal Age," Vol. 3, p. 628.

Island Creek Coal Co.

This company reports in part for the fiscal year ended Dec. 31, 1913, as follows:

Results—The mines during 1913 produced 1,916,000 tons, which is a decrease of 123,787 tons from 1912, the first decrease since mining operations began in your properties. The net profits also show a decrease of $47,460, due principally to the extraordinary causes below mentioned, which not only reduced the output but also to some extent disorganized our operating forces, involving a high expense.

In January 1913 a bridge on the Chesapeake & Ohio Ry., in process of erection across the Guyandotte River, near Huntington, W. Va., collapsed, and as all west-bound coal originating east of Huntington has to pass over this river, freight movements to the west on the Chesapeake & Ohio Ry. were very largely suspended for two or three weeks.

In April, owing to almost unprecedented floods, operations were again completely suspended on west-bound traffic for the best part of one month. The railroads affected by the floods were unable for several months thereafter to handle satisfactorily the same volume of traffic as previous to the floods. Your transportation properties on the Ohio River were not damaged to any extent by the floods nor was any of the floating equipment lost. Railroad transportation conditions, moreover, were poorer than usual.

During the entire year there was an ample market for coal, and your company could have disposed of a larger tonnage than it did if railroad transportation facilities had permitted. The new dock at Duluth was placed on an operating basis and handled a fair tonnage of coal in a very satisfactory manner. In June the saw-mill at Holden was destroyed by fire, and there were, therefore, no earnings from that source during the last six months. The sawmill, having been rebuilt, was put in operation in Jan. 1914.

The increase of $13,139 in the administrative and general expenses is the result of additional burdens imposed by the new income tax Act.

The charge against earnings for depreciation has been increased over that of last year, notwithstanding that a smaller tonnage was produced, and it is the belief that depreciation charges are upon a liberal basis.

Dividends—Preferred dividends at rate of $6 per share per year and ordinary dividends on common stock at rate of $2 per share per year, as well as an extra dividend on the common stock of $3 per share, were paid during 1913. The extra dividend was intended as a distribution of part of the surplus which had been accumulated in earlier years. The total of the surplus , Dec. 31, 1913, was $848,796, a reduction of $200,025 from last year.

COAL SECURITIES

The following table gives the range of various active coal securities during the week ending July 30, the New York Exchange being suspended Friday and Saturday July 31 and Aug. 1:

Stocks	Week's Range High	Low	Last	Year's Range High	Low
American Coal Products	....	....	85½	96½	82
American Coal Products Pref.	....	....	105	106	102
Colorado Fuel & Iron	24¼	20½	21½	34½	20½
Colorado Fuel & Iron Pref.	....	....	140	140	140
Consolidation Coal of Maryland	....	....	102½	....	....
Island Creek Coal Com	48¾	46	46	....	....
Island Creek Coal Pref.	88½	87	87	....	....
Lehigh Valley Coal Sales	....	....	....	....	....
Pittsburgh Coal	18½	16½	16½	23½	16½
Pittsburgh Coal Pref.	87½	82	82	93½	82
Pond Creek	16½	13	13	....	....
Reading	160¾	137	140	172½	137
Reading 1st Pref.	88	87	87	89¾	87
Reading 2nd Pref.	85	82	82	93	92
Virginia Iron, Coal & Coke	40	35	37	52	35

Bonds	Closing Bid	Asked	Week's Range or Last	Sale	Year's Range	
Colo. F. & I. gen. s. f. g. 5s	88	....	90	90	86	99
Colo. F. & I. gen. 6s	104	....	105	July '14	105	105
Col. Ind. 1st & coll. 5s. gu	71	Sale	71	71	71	82
Cons. Ind. Coal Mc. 1st 5s	....	70	73	Mch '14	73	79
Cons. Coal 1st and ref. 5s	....	92	89½	J'ly '14	89	90½
Gr. Riv. Coal & C. 1st g 6s	89	....	99½	Feb '14	99½	99½
K. & H. C. & C. 1st s f g 5s	....	98½	102⅜	Apr '06z	....	....
Pocah. Con. Coll. 1st s f 5s	....	93½	93	Mch '14	93	93½
St. L. Rky. Mt. & Pac. 1st 5s	86	Sale	86	86	84	88½
Tenn. Coal gen. 5s	....	81	78	78	77	82
Birm. Div. 1st consol. 6s	102½	102¾	102¾	102¾	97½	103½
Tenn. Div. 1st g 6s	101¼	103	102	102	101½	103
Cah. C. M. Co. 1st g 6s	101¾	103	101⅞	J'ne '14	101	102½
Utah Fuel 1st g 5s	101	....	101¼	Mch '14	101½	101¼
Victor Fuel 1st s f 5s	....	74	73	Apr '14	73	73
Va. I. Coal & Coke 1st g 5s	85	91½	90	J'ly '14	90	95

DIVIDENDS

Burns Bros.—Regular quarterly dividend on the common stock of 1¼%, payable Aug. 15 to holders of record Aug. 1, and regular quarterly No. 6 on the preferred stock of 1¾%, payable Aug. 1 to holders of record July 17.

Pacific Coast Co.—Regular quarterly on the common and second preferred of 1% and on the first preferred of 1¼%, all payable Aug. 1 to holders of record July 25.

Dominion Coal Co., Ltd.—Dividend of 3½% on preferred, payable Aug. 1 to holders of record July 17.